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Fire Prevention and Control

Maintenance Series Handbook MS-58

P1.31/6:

U.S. Postal Service
Washington, DC 20260

Operation and Maintenance Handbook
Fire Prevention and Control
MS-56

Transmittal Letter 2

January, 1986

A. EXPLANATION

The attached handbook is a complete revision of MS-56, to widen the scope of fire prevention. Therefore, MS-56, TL2, has been renamed "Fire Prevention and Control."

B. DISTRIBUTION

1. Initial. Copies of this complete issue are being distributed to all facilities and Postal Employee Development Centers (PEDCs).

2. Additional Copies. Order additional copies directly from your supply center on Form 7380, Supply Center Requisition.

C. RESCISSIONS

All copies of the original issue of MS-56, "Fire Extinguishing Equipment," TL1, are rescinded and should be discarded.

D. COMMENTS AND QUESTIONS

Recommendations for improving the guidelines, information, and procedures contained in this handbook are solicited from all sources. Anyone wishing to make such recommendations should submit them to:

Field Director
Maintenance Technical Support Center
P. O. Box 1600
Norman, OK 73070-6708

E. EFFECTIVE DATE

These instructions are effective on receipt.

Peter A. Jacobson
Acting Assistant Postmaster General
Engineering and Technical
Support Department

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Fire Prevention and Control

Maintenance Series Handbook MS-56

Publication: January 1986

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Published By The

MAINTENANCE TECHNICAL SUPPORT CENTER
OFFICE OF MAINTENANCE MANAGEMENT
111 Chesapeake St.
P.O. Box 1600
Norman, Oklahoma 73070-6706

List of Effective Pages

Page No.	Change No.

Record of Corrections and Entries

Correction or Change	Purpose of Correction or Change	Entered By	Date

FOREWORD

This Handbook explains, in general, fire prevention and control for postal facilities. It is divided into chapters that pertain to specific aspects of fire control and prevention and reflects the current theories of how fires start and propagate. New technologies for detecting and extinguishing fires are discussed.

This Handbook may be used as a source for planning, equipment selection, training, and general fire information. Numerous references to both postal and non-postal documents are contained at the end of each chapter.

CHAPTER 1

EMERGENCY PLANNING

110 GENERAL 1-1

120 EMERGENCY PLANNING 1-1
121 Types Of Emergencies 1-1
122 Emergency Action Plan 1-3
123 Fire Prevention Plan 1-3
124 Emergency Action Plan and Fire Prevention Plan Training 1-3
125 Employee Alarm Systems (Evacuation) 1-3
126 PreFire Planning 1-4
127 Cooperation and Coordination With Other Agencies 1-5

CHAPTER 2

FIRE BRIGADES AND MEANS OF EGRESS

210 FIRE BRIGADES 2-1
211 Organization 2-1
212 Objective 2-1
213 Incipient Stage Fires 2-1
214 Duties of the Fire Brigade 2-1
215 Membership 2-3
216 Physical Requirements 2-3
217 Training 2-4
218 Fire Brigade Plan Reviews 2-4

220 MEANS OF EGRESS 2-6
221 General 2-6
222 Definition 2-6
223 Headroom 2-6
224 Doors 2-6
225 Hardware For Doors In Means Of Egress 2-6
226 Arrangement Of Means Of Egress 2-9
227 Travel Distances To Exits 2-9
228 Illumination Of Means Of Egress 2-9
229 Exit Marking 2-9

CHAPTER 3

FLAMMABLE AND COMBUSTIBLE MATERIALS

310 GENERAL 3-1
311 Scope 3-1
312 Purpose 3-1
313 Mailability and Transportation 3-3
314 Oil Burning Equipment 3-3
315 Material Safety Data Sheets 3-3

320 DEFINITIONS 3-3
321 Approved (Labeled or Listed) 3-3
322 Boiling Point 3-3
323 Flash Point 3-3
324 Combustible Liquids 3-4
325 Container 3-4
326 Fire Area 3-4
327 Flammable Liquid 3-5
328 Safety Can 3-5
329 Service Station 3-5

330 INSIDE STORAGE 3-5
331 General 3-5
332 Containers and Uses 3-5
333 Separation and Protection 3-6
334 Storage Cabinets 3-6
335 Storage Rooms 3-9

340 OUTSIDE STORAGE 3-11
341 Consideration 3-11
342 Mixed Storage 3-11
343 Maximum Storage 3-11
344 Spill Containment 3-11
345 Security 3-11
346 Fire Control 3-12

350 HANDLING MATERIALS 3-12
351 Scope 3-12
352 Covered Containers 3-12
353 Spills and Leakage 3-12
354 Dispensing 3-12
355 Drip Cans 3-13
356 Vents 3-13
357 Labeling 3-13
358 Grounding and Bonding 3-13

360 SERVICE STATIONS 3-13
361 General 3-13
362 Storage 3-13
363 Piping, Valves and Fittings 3-13

364 Pumps 3-14
365 Vapor Recovery Systems 3-14
366 Emergency Power Shut-Off 3-14
367 Control Of Ignition Sources 3-14
367 Fire Control 3-14

370 SPRAYING FLAMMABLE AND COMBUSTIBLE MATERIALS 3-14
371 General 3-14
372 Spraying Area 3-15
373 Design and Construction 3-15
374 Cleaning 3-15
375 Sources Of Ignition 3-15
376 Sprinkler Heads 3-15
377 Ventilation 3-15
378 Operations and Maintenance 3-15

CHAPTER 4

PORTABLE FIRE EXTINGUISHERS

410 GENERAL 4-1
411 Scope 4-1
412 Purpose 4-1

420 THE COMBUSTION PROCESS 4-1
421 The Fire Triangle 4-1
422 The Fire Tetrahedron 4-1

430 CLASSES OF FIRES 4-1
431 General 4-1
432 Class A Fires 4-3
432 Class B Fires 4-3
432 Class C Fires 4-3
432 Class D Fires 4-3

440 EXTINGUISHER LABELING, NUMBERING, AND TAGGING 4-3
441 Conventional Labeling 4-3
442 Pictographic Labeling 4-5
443 Numbering 4-5
444 Tagging 4-5

450 MOUNTING EXTINGUISHERS 4-5
451 Wall Mounted 4-5
452 Column Mounted 4-5

460 SELECTION AND DISTRIBUTION OF PORTABLE EXTINGUISHERS 4-7
461 Selection 4-7
462 Distribution 4-7

470 OBSOLETE EXTINGUISHERS 4-7

480 INSPECTION, MAINTENANCE, AND TESTING
PORTABLE EXTINGUISHERS 4-7
481 Inspection 4-7
482 Hydrostatic Testing 4-9
483 Contracted Maintenance Services 4-9

490 REPLACEMENT OF EXTINGUISHERS 4-9

CHAPTER 5

HOT WORK FIRE PROTECTION

510 GENERAL 5-1

520 FIRE AND EXPLOSION POTENTIAL 5-1

530 APPROVAL 5-1

540 LOCATION 5-1
541 Authorized Hot Work Areas 5-1
542 Unauthorized Hot Work Areas 5-2

550 PROCEDURE 5-2
551 Inspection 5-2
552 Notification and Approval 5-2
553 Assignment 5-2
554 Fire Watcher 5-3

560 STORAGE AND USE OF OXYGEN AND ACETYLENE CYLINDERS 5-3
561 General 5-3
562 Storage 5-3
563 Transportation 5-4
564 Inspection 5-4
565 Cylinder Use 5-4

CHAPTER 6

FIRE ALARM SIGNAL AND DETECTION SYSTEMS

610 GENERAL 6-1

620 PURPOSE 6-1

630 TYPES OF ALARM SYSTEMS 6-1
631 Use 6-1
632 Local Alarm Systems 6-2
633 Proprietary Alarm System 6-2
634 Central Station Alarm System 6-2
635 Remote and Auxiliary Alarm Systems 6-2

640 TYPES OF SIGNALS 6-2
641 Alarm Signal 6-2
642 Trouble Signal 6-3
643 Supervisory Signal 6-3
644 Voice Communication Systems 6-3
645 Visual and Tactile Signals 6-3

650 ALARM INITIATORS 6-3
651 Pull Box 6-3
652 Detectors 6-3
653 Extinguishing System Alarms 6-6

660 DETECTION SYSTEMS 6-6
661 Products Of Combustion Detectors 6-6
662 Heat Detectors 6-6
663 Smoke Detectors 6-9
664 Flame Detectors 6-11
665 Installation Of Detectors 6-11

670 MAINTENANCE AND TESTING 6-12
671 General 6-12
672 Equipment Inspection 6-14
673 Detector Testing 6-14
674 Control Equipment Inspection 6-15

680 RESPONSIBILITY 6-16

CHAPTER 7

STANDPIPE AND HOSE SYSTEMS

710 GENERAL 7-1
711 Scope 7-1
712 Hardware 7-1
713 Water Supply 7-1
714 Effectiveness 7-1
715 Classification 7-1

720 TYPES OF SYSTEMS 7-2

730 WATER SUPPLY FOR STANDPIPE SYSTEMS 7-2

740 SYSTEM REQUIREMENTS 7-2
741 General 7-2
742 Number and Location Of Standpipes 7-2
743 Location Of Standpipe 7-3

750 HOSE CONNECTION REQUIREMENTS 7-3
751 Location 7-3
752 Threads 7-3
753 Hose, Hose Racks, and Nozzles 7-3

760 TESTS, INSPECTIONS, AND MAINTENANCE 7-4
761 Tests 7-4
762 Inspection 7-4
763 Maintenance 7-5

CHAPTER 8

SPRINKLER SYSTEMS

810 GENERAL 8-1
811 Scope 8-1
812 Purpose 8-1

820 DEFINITION 8-1

830 BASIC REQUIREMENTS 8-1
831 Fire Department Connections 8-1
832 Vertical Clearance 8-1
833 Water Supply 8-1
834 Flow Alarms 8-2

840 TYPES OF SPRINKLERS 8-2
841 Wet Pipe Systems 8-2
842 Dry Pipe Systems 8-2
843 Deluge and Preaction Systems 8-2

850 ASSOCIATED EQUIPMENT 8-3
851 Valves 8-3
852 Alarm Systems 8-3
853 Sprinkler Heads 8-3
854 Pumper Connections 8-3
855 Fire Pumps 8-3
856 Retarding Chamber 8-3
857 Exhauster or Accelerator 8-5

860 TESTING 8-5
861 Inspector Test Valves 8-5
862 Flow Test 8-5
863 Acceptance Test 8-5
864 Repairs 8-5

870 MAINTENANCE 8-6
871 Responsibility 8-6
872 Inspection 8-6
873 Training 8-7

CHAPTER 9

SPECIAL PURPOSE FIXED EXTINGUISHING SYSTEMS

910 GENERAL 9-1
911 Scope 9-1
912 Purpose 9-1
913 Definition 9-1

920 SYSTEM REQUIREMENTS 9-1
921 Alarms 9-1
922 Signs 9-1
923 Abort Switches 9-1
924 Records 9-1
925 Rescue 9-2

930 TYPES OF SYSTEMS 9-2
931 Carbon Dioxide (CO_2) Systems 9-2
932 Halon 1301 Systems 9-3

940 SYSTEM OPERATION 9-3
941 Automatic Operation 9-3
942 Manual Operation 9-4

950 TRAINING 9-4

960 TESTING 9-4
961 Requirements 9-4
962 High Pressure Cylinders 9-4

970 MAINTENANCE 9-5
971 Operating Condition 9-5
972 Service Requirements 9-5
973 Monthly Inspection 9-5
974 Pressure Checks 9-5
975 Cylinder Weight 9-5
976 Designation 9-5

CHAPTER 1

Figure 1-1 1-6

CHAPTER 2

Figure 2-1 2-2
Figure 2-2 2-7
Figure 2-3 2-9
Figure 2-4 2-9

CHAPTER 3

Figure 3-1 3-7
Figure 3-2 3-7
Figure 3-3 3-8
Figure 3-4 3-8

CHAPTER 4

Figure 4-1 4-2
Figure 4-2 4-2
Figure 4-3 4-4
Figure 4-4 4-4
Figure 4-5 4-6
Figure 4-6 4-6
Figure 4-7 4-8

CHAPTER 5

None

CHAPTER 6

Figure 6-1 6-4
Figure 6-2 6-5
Figure 6-3 6-7
Figure 6-4 6-7
Figure 6-5 6-7
Figure 6-6 6-10

CHAPTER 7

None

CHAPTER 8

Figure 8-1 8-4

CHAPTER 9

None

CHAPTER 1

Exhibit 1-1 1-2
Exhibit 1-2 1-7

CHAPTER 2

Exhibit 2-1 2-5
Exhibit 2-2 2-10

CHAPTER 3

Exhibit 3-1 3-2
Table 3-1 3-10
Table 3-2 3-10
Exhibit 3-2 3-17

CHAPTER 4

Table 4-1 4-8
Exhibit 4-1 4-10

CHAPTER 5

Exhibit 5-1 5-5
Exhibit 5-2 5-6

CHAPTER 6

Exhibit 6-1 6-13
Exhibit 6-2 6-17

CHAPTER 7

Exhibit 7-1 7-6

CHAPTER 8

Exhibit 8-1 8-8

CHAPTER 9

Exhibit 9-1 9-6

CHAPTER 1

EMERGENCY PLANNING

110 GENERAL

The purpose of this chapter is to provide necessary information to maintenance and safety managers on fire prevention and protection in postal owned or postal leased buildings. It also provides general information for maintenance and safety managers regarding the organization, training and function of postal fire brigades as required by Employee and Labor Relations Manual para. 850, and the minimum life safety aspects required for each postal installation.

120 EMERGENCY PLANNING

121 Types Of Emergencies

Emergency planning is necessary to recognize the potential effect of an emergency before it happens. The type of emergencies which may require action from postal fire brigades and necessitate advanced planning include:

a. Fires and explosions.

b. Floods.

c. Hurricanes and tornadoes.

d. Severe winter storms.

e. Hazardous material spill and leak control.

f. Earthquakes.

g. Work place accidents.

122 Emergency Action Plan

An Emergency Action Plan (EAP) must be developed for every postal facility having more than ten employees on the rolls. The EAP must include designated actions which management and employees take to ensure the safety of employees and the protection of property. The installation head is responsible for ensuring the development of the EAP. More specific guidelines for content and format are found in Employee and Labor Relations Manual para. 850 (see Exhibit 1-1 for an Emergency Action Plan Checklist).

EXHIBIT 1-1

EMERGENCY ACTION PLAN (EAP) CHECKLIST

1. Is the EAP written and available if there are over ten (10) employees? Yes_____ No_____
2. Are graphic illustrations of exits, routes, and fire extinguishing equipment posted in prominent locations? Yes_____ No_____
3. Are the names or job titles of persons who can be contacted for information posted? Yes_____ No_____
4. Do all employees know what procedures to follow in case of an evacuation? Yes_____ No_____
5. Do all employees know how to report a fire or other emergency? Yes_____ No_____
6. Is the procedure for reporting a fire or other emergency posted? Yes_____ No_____
7. If the facility has an alarm system, do employees know if it will summon the fire department? Does it state so near the alarm? Are other emergency telephone numbers posted? Yes_____ No_____
8. Are safe or refugee areas established? Do employees know to which area they are to report? Yes_____ No_____
9. Is there an adequate number of employees assigned to the various duties of the fire brigade in order to ensure the safe, orderly, and complete evacuation of the building? Yes_____ No_____
10. Has the fire brigade been trained in how to respond to emergencies other than fire, such as bomb threats, power outages, explosions, or natural disasters? Yes_____ No_____
11. Are procedures for managing various types of emergencies outlined? Yes_____ No_____
12. Have procedures for employees who will act as floor wardens or handicap "buddies" been established? Yes_____ No_____
13. Has there been an emergency preplanning meeting? Yes_____ No_____
14. Has the local fire department been invited to become familiar with the facility layout? Yes_____ No_____
15. Are different exit routes used by employees during drills? Yes_____ No_____
16. Have contingency plans been established for emergencies other than fire such as hazardous materials released? Power outages, floods, bomb scares, explosions, etc.? Yes_____ No_____
17. Are exit drills monitored by observers for efficiency? Yes_____ No_____
18. Are post-exit drills conducted to discuss irregularities and problems? Yes_____ No_____
19. Is follow-up monitoring conducted to ensure that corrective actions have been taken? Yes_____ No_____
20. Are reviews conducted when the plan changes? Yes_____ No_____ With new employees? Yes_____ No_____

123 Fire Prevention Plan

A Fire Prevention Plan (FPP) must be developed for every postal facility larger than 10,000 square feet. The plan must include designated actions management and employees must take to ensure the safety of employees and the protection of property. Specific procedures should be developed for each part of the FPP. Items such as notifying employees of emergencies, evacuation procedures, and prefire planning information must be included in the plan. Plan development must not be limited to only the facility fire protection needs, but must satisfy the requirements of local fire codes and standards, laws and local ordinances. The installation head must ensure the development of the FPP. More specific guidelines for content and format are found in Employee and Labor Relations Manual para. 850.

124 Emergency Action Plan and Fire Prevention Plan Training

The emergency action and fire prevention plans must be reviewed with each employee of the installation at the following times:

a. When the plans are first developed.

b. Whenever there is a change in employee responsibility or designated actions under the plans.

c. Whenever the plans are revised, or annually, if there have been no revisions during the previous year.

d. The immediate supervisor must review with all newly assigned employees those parts of the plans which the employees must know to protect themselves in an emergency.

e. The plans must be posted at the work place and be available for employee review.

125 Employee Alarm Systems (Evacuation)

Every postal owned or postal leased facility must have an established general employee alarm system to provide the warning necessary to start emergency action. The system must comply with Occupational Safety and Health Administration (OSHA) standard 1910.165., which includes:

a. A warning which provides adequate reaction time for employees to evacuate the danger area or the work place.

b. Signals and alarms that can be perceived (seen or heard) above ambient noise or light levels by all employees in the affected areas of the work place.

c. The procedures must include evacuation for all employees, including the handicapped.

d. A distinctive and recognizable signal to evacuate the work area or to perform designated actions under the EAP. Tactile devices must be used to alert employees who are unable to recognize the audible or visual signals.

e. Procedures for informing each employee of the means of reporting emergencies, such as manual pull boxes, public address systems, radios, or telephones.

f. Where a communication system also serves as the employee alarm system, all emergency messages must have priority over all nonemergency messages.

g. Emergency telephone numbers must be conspicuously posted near all telephones, on employee bulletin boards, and at other locations where telephones serve as a means of reporting emergencies.

h. Direct voice communication, bells, gongs, air horns, etc., may sound the alarm, in installations with fewer than ten employees, provided employees understand the purpose.

i. If the general employee alarm system is also used to alert members of the fire brigade, or for other purposes, a distinctive signal for each purpose must be used.

NOTE

If questions arise over OSHA standards, contact the appropriate Management Sectional Center (MSC) Employee and Labor Relations Office.

126 Prefire Planning

126.1 Purpose

The purpose of prefire planning is to:

a. Identify fire problems in the facility.

b. Develop appropriate emergency medical and fire prevention plans.

c. Prepare fire brigade members to effectively control fires.

126.2 Considerations

Emergency planning for fire protection begins with a survey of the facility to gather information about safety, fire control, and property conservation. Form

1784, Safety and Health Inspection Checklist, serves as a reminder of what information should be collected and provides a systematic method to record the collected information. Items to consider during prefire planning include:

a. Building security, entry, egress, and accessibility.

b. Heating, Ventilating, and Air Conditioning (HVAC) equipment.

c. Water supplies.

d. Fire equipment.

e. Municipal resources.

f. Exposures to adjacent property.

g. Explosion hazards.

h. Storage areas.

i. Critical operations.

j. Utilities.

k. Safety.

l. Medical resources.

m. Any special rescue problems.

NOTE

The local fire department can assist in the development of a prefire plan for your particular installation.

127 Cooperation and Coordination with Other Agencies

127.1 Local Fire Department

In developing EAPs and FPPs, local fire departments must be familiar with the facility's general layout, its processes or operations, and the types and locations of hazardous materials and any other special hazards. Regular preemergency planning sessions with the local fire department will provide current information on any changes, and allow for more effective coordination. The installation head is also encouraged to seek assistance from local fire officials, and permit them to conduct periodic fire inspections.

127.2 Other Local Agencies

Liaison with law enforcement agencies must be established in advance of emergencies to develop plans to control traffic and the public. Emergency medical services available at the postal installations will determine the need for interaction with local emergency medical services. Postal installations should keep an up-to-date list of all cooperating agencies, conspicuously posted in the maintenance area (see figure 1-1 for example).

EMERGENCY TELEPHONE NUMBERS

FIRE	**555-1111**
POLICE	**555-1112**
AMBULANCE	**555-1113**
DOCTOR	555-1114
CIVIL DEFENSE	555-1115
WATER COMPANY	555-1116
ELECTRIC COMPANY	555-1117
ENVIRONMENTAL PROTECTION AGENCY	555-1118
SPILL RECOVERY COMPANY	555-1119
SECURITY SYSTEM COMPANY	555-1110
GAS COMPANY	555-1121
GUARD COMPANY	555-1122
HOSPITAL	555-1123
CHEMTREC	555-1124
HEALTH DEPARTMENT	555-1126
SPRINKLER CONTRACTOR	555-1127

Figure 1-1

EXHIBIT 1-2

REFERENCES AND STANDARDS

OSHA General Industry Standards

1910.165, Employee Alarm Systems

US Postal Service Documents

Employee and Labor Relations Manual Chapter 8

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

USPS documents and directives are requisitioned from area supply centers on Form 7380 Supply Center Requisition.

CHAPTER 2

FIRE BRIGADES AND MEANS OF EGRESS

210 FIRE BRIGADES

211 Organization

All postal installations having 10,000 square feet or more must maintain, on each work tour, an organized and trained fire brigade. Fire brigades may be maintained in smaller facilities when warranted by the type of operations conducted and the availability of municipal fire departments. The number of members, scope of responsibility, physical characteristics of the building and specific needs will determine how the fire brigade is organized into functional teams. See figure 2-1 for an example of how to organize a fire brigade into functional teams.

212 Objective

The objectives of fire brigades are:

a. Respond quickly to a fire or other emergency in order to contain, control, or extinguish fires until the arrival of the local fire department or other emergency assistance.

b. Control the orderly evacuation of the building.

213 Incipient Stage Fires

Postal fire brigades are not expected to fight fires beyond the incipient stage. An incipient stage fire is in its initial stage and can be controlled, contained or extinguished by portable extinguishers, Class II standpipe and hose systems, or other small hose systems, without use of personal protective clothing or equipment, and within the means and capability of the fire brigade.

214 Duties of the Fire Brigade

The duties of the fire brigade may include, but are not limited to:

a. Stopping conveyor belts

b. Closing doors to rooms and dump hole covers.

c. Directing the fire department to the location of the fire (or other emergency).

d. Evacuating injured and handicapped personnel and controlling the evacuation of the building occupants.

e. Inspecting the fire site with the fire department to determine that the fire is completely extinguished and that there is no possibility of rekindling.

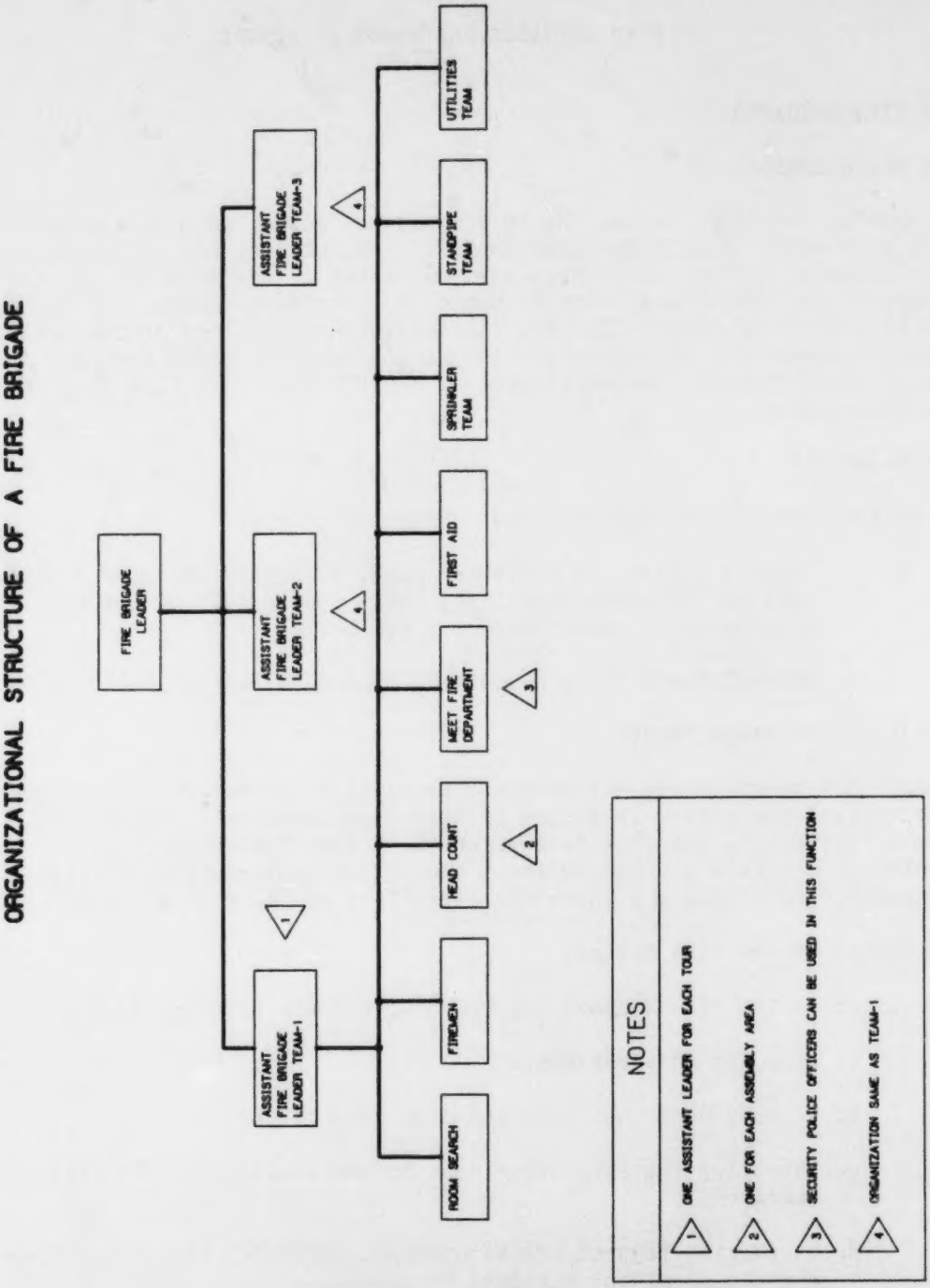

ORGANIZATIONAL STRUCTURE OF A FIRE BRIGADE
FIRE BRIGADE LEADER
ASSISTANT FIRE BRIGADE LEADER TEAM-1
ASSISTANT FIRE BRIGADE LEADER TEAM-2
ASSISTANT FIRE BRIGADE LEADER TEAM-3
ROOM SEARCH
FIREMEN
HEAD COUNT
MEET FIRE DEPARTMENT
FIRST AID
SPRINKLER TEAM
STANDPIPE TEAM
UTILITIES TEAM
NOTES
1 ONE ASSISTANT LEADER FOR EACH TOUR
2 ONE FOR EACH ASSEMBLY AREA
3 SECURITY POLICE OFFICERS CAN BE USED IN THIS FUNCTION
4 ORGANIZATION SAME AS TEAM-1

Figure 2-1

f. Ensuring vans and trucks are moved from loading docks.

g. Shutting down critical operations or equipment as directed by the fire department.

h. Maintaining security to prevent reentry into the building until properly notified by the fire department, and assisting the fire department or police in maintaining crowd control.

i. Operating portable fire extinguishers and Class II standpipe hose systems.

j. Locking out elevators.

215 Membership

215.1 General

Building maintenance and security personnel make up the nucleus of the fire brigade. Additional personnel may be assigned to ensure adequate coverage on all work tours. The fire brigade is composed of a fire brigade leader, an assistant leader, and brigade members.

215.1 Fire Brigade Leader

The installation head appoints the manager responsible for building maintenance or someone equally familiar with the building and operations to be fire brigade leader. The fire brigade leader is given the authority to take full charge in emergencies and is responsible for fire brigade activities, including training. The fire brigade leader sets up the fire brigade, maintains the roster of members and their training, and develops plans of action to cope with anticipated fires (the Fire Brigade Plan), and other emergencies at the installation. Further, the leader selects brigade members to protect all parts of the building on all work tours. The leader conducts critiques after each drill or emergency. The leader must establish a procedure to provide quarterly review of the program to ensure operational efficiency.

215.3 Assistant Fire Brigade Leader

The Assistant Fire Brigade Leader serves as the leader at the fire or other emergency until the fire brigade leader arrives or, in his absence, assumes command.

215.4 Brigade Members

Fire brigade members attend meetings, drills, and training sessions relative to fire control, prevention, and safety. They perform functions relative to fire protection, fire safety, fire extinguishment, and other emergencies.

216 Physical Requirements

The fire brigade leader must ensure that all members of the fire brigade are physically capable of performing the tasks assigned to them during training or

actual emergencies. Employees with known heart disease, epilepsy, or chronic obstructive pulmonary diseases must not be permitted to participate in any fire brigade activity unless they present a medical certificate of fitness from their personal physician stating that they are physically capable of performing such duties. Employees with known physical handicaps are permitted to be fire brigade members; however, their job assignments are governed by their ability to perform certain tasks.

217 Training

All fire brigade members must complete an initial basic level of training, both upon becoming a member of the brigade and before performing any activity as a member of the brigade. Thereafter, members must be provided with refresher training every quarter. Fire brigade leaders and training instructors must be provided with training and education more comprehensive than that provided to the general brigade membership.

218 Fire Brigade Plan Reviews

A review to determine that various objectives of a sound Fire Brigade Plan are met should be conducted at least once a year in each office having a brigade. It is recommended that the Fire Brigade Plan be reviewed by the maintenance manager, the director of mail processing, and the safety manager at least once each quarter. Other station and branch or associate office plans must be reviewed by the local safety office as part of the annual or semiannual safety inspections. Deficiencies must be corrected immediately. Exhibit 2-1, The Fire Brigade Plan Checklist, will help in evaluating various Fire Brigade Plans.

EXHIBIT 2-1

FIRE BRIGADE PLAN CHECKLIST

1. Are trained fire brigades maintained on each work tour in facilities with more than 10,000 sq. ft.?
   Yes_____ No_____
2. Is there a written organizational policy statement? Yes_____ No_____
3. Are there enough brigade members assigned for each tour? Are all positions filled? Yes_____ No_____
4. Do all brigade members understand their duties? Yes_____ No_____
5. Have all brigade members been provided with annual hands-on training? Yes_____ No_____
6. Are quarterly refresher programs given to members? Yes_____ No_____
7. Are all fire brigade members and employees instructed that they should not fight fires which go beyond the incipient stage? Yes_____ No_____
8. Have brigade members been instructed on any special hazards? Yes_____ No_____
9. Has the local fire department been contacted for equipment coordination purposes? Yes_____ No_____
10. Is all fire control equipment in good working condition? Yes_____ No_____
11. Has all fire control equipment been tested and/or inspected, as required? Yes_____ No_____
12. Do all employees in each facility know what they are to do in case of fire? Yes_____ No_____
13. Do all employees in each facility know how to properly notify the fire department? Yes_____ No_____
14. Do all employees know where to report after evacuating the building for employee head counts? Yes_____ No_____
15. Have all employees in each facility been given at least general training in the following:

    A. Evacuation procedures? Yes_____ No_____
    B. Preferred and alternate means of egress? Yes_____ No_____
    C. Good housekeeping? Yes_____ No_____
    D. Fire prevention? Yes_____ No_____
    E. Smoking regulations? Yes_____ No_____
    F. Other relevant items for that specific office? Yes_____ No_____

220 MEANS OF EGRESS

221 General

This section establishes minimum requirements for the means of egress in postal installations. For more specific requirements, reference should be made to the current editions of the National Fire Prevention Association (NFPA) Life Safety Code or to particular NFPA standards as appropriate (see Exhibit 2-2).

222 Definition

A means of egress is a continuous and unobstructed way of exit travel from any point in a building to a public way. It consists of three separate and distinct parts: the way of exit access, the exit, and the way of exit discharge. A means of egress comprises the vertical and horizontal ways of travel and includes intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, enclosures, lobbies, escalators, horizontal exits, courts, and yards. The following are specific definitions:

a. Exit Access is that portion of a means of egress which leads to an entrance to an exit (see figure 2-2).

b. Exit is that portion of a means of egress which is separated from all other spaces of the building, structure construction, or equipment to provide a protected way of travel to the exit discharge (see figure 2-2).

c. Exit Discharge is that portion of a means of egress between the termination of an exit and a public way (see figure 2-2).

223 Headroom

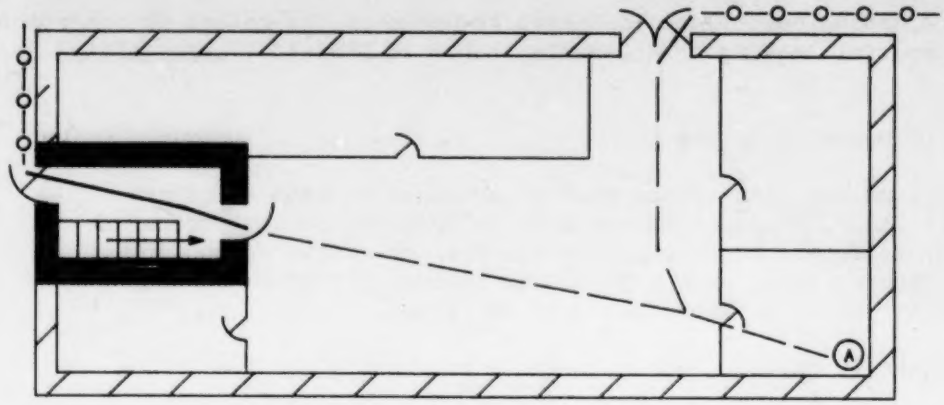
Means of egress must be designed and maintained so as to provide adequate headroom. In no case may the ceiling height be less than 7 feet 6 inches or any projection from the ceiling be less than 6 feet 8 inches from the floor.

224 Doors

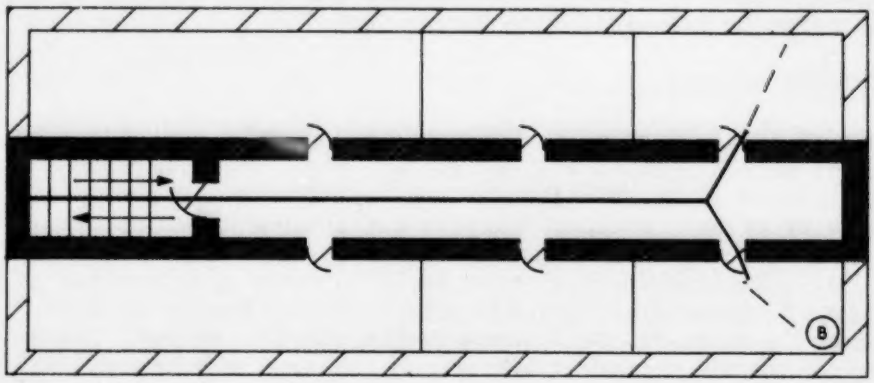
Every door and every principal entrance that serves as an exit must be designed and constructed so that the way of exit is obvious and direct. Any door in a means of egress must be side-hinged, swinging in the direction of exit travel. No exiting doors (a door leading inside or out) may be less than 28 inches wide nor may a single door in a doorway exceed 48 inches in width. The force required to fully open any door in the means of egress must not exceed 50 pounds applied to the latch stile.

225 Hardware for Doors in Means of Egress

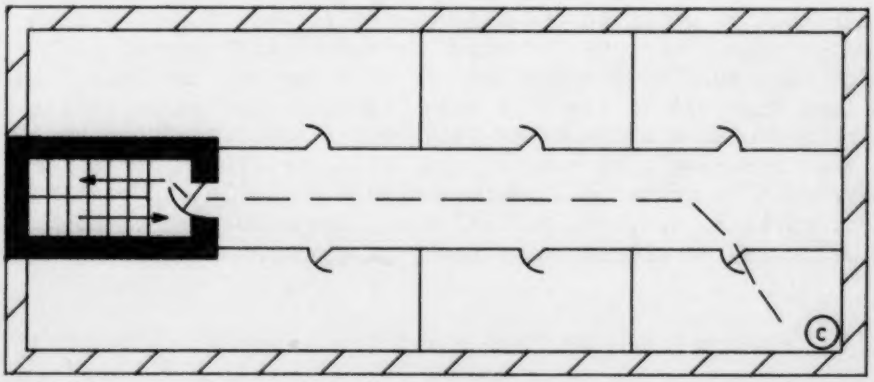
When the building is occupied, exit doors must be arranged so they can be readily opened from the side where egress is made. A latch or other fastening device on a door must be provided with a panic bar, knob, handle, or other



FIRST FLOOR



SECOND FLOOR



THIRD FLOOR

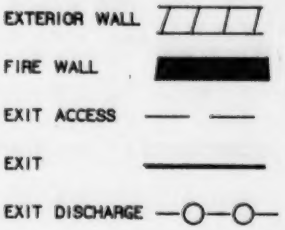


Figure 2-2

simple type of releasing device, so that even in darkness the method of operation is obvious. For special locking arrangements, refer to NFPA-101, Life Safety Code.

226 Arrangement of Means of Egress

Exits must be located and exit access must be arranged so that exits are accessible at all times. Means of egress must be arranged so that there are no dead end pockets, hallways, corridors, passageways, or courts whose depth exceeds 50 feet. Access to an exit must not be through storerooms, restrooms, closets, or similar spaces or rooms that may be locked.

227 Travel Distances to Exits

The maximum allowable travel distance for office areas in new or existing facilities that are sprinkled (equipped with a sprinkler system) is 300 feet, and 200 feet in unsprinkled facilities. The maximum allowable travel distance to an exit in the workroom must not exceed 150 feet in sprinkled buildings and 100 feet in unsprinkled buildings. For exceptions to these travel distances, or for particular problems, refer to NFPA-101, Life Safety Code.

228 Illumination of Means of Egress

The means of egress must be illuminated in every postal owned or postal leased building. This includes all designated stairs, aisles, corridors, ramps, and passageways leading to an exit. Illumination must be continuous and provided along the natural path of egress, including angles and intersections of corridors and passageways, stairs, landings of stairways, and designated exit doors (see figure 2-3). Illumination must be at least 1 footcandle measured at the floor. The failure of any single lighting unit, such as a burnt out bulb, must not leave any area in darkness. Self-luminous (ie. phosphorescent) signs are not approved for use as the primary light source for exit signs in postal owned or leased buildings.

229 Exit Marking

Exits must be marked by an approved sign visible from any direction. Sign placement must be such that no point in the exit access is more than 100 feet from the nearest visible sign. Every "exit" sign, "directional" (arrow) exit sign, or "not an exit" sign must be plainly legible with letters not less than 6 inches high and not less than 3/4 inches wide (see figure 2-4). The lettering may be either green or red with a white matte background, depending upon local building codes, but must contrast with decorations, interior finish, or other signs. Every exit sign must be suitably illuminated by a reliable and continuous light source. No sign, curtain, drapery, poster, etc., that obscures or confuses the location of the exit, may be placed at or near any designated exit.

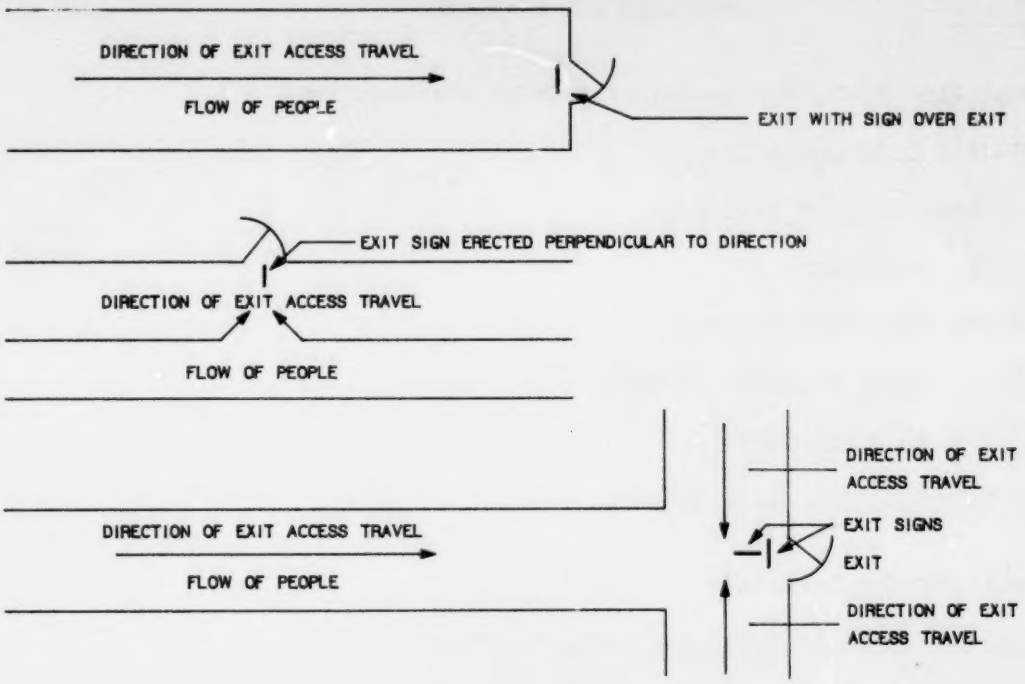

DIRECTION OF EXIT ACCESS TRAVEL
FLOW OF PEOPLE
EXIT WITH SIGN OVER EXIT
EXIT SIGN ERECTED PERPENDICULAR TO DIRECTION
DIRECTION OF EXIT ACCESS TRAVEL
FLOW OF PEOPLE
DIRECTION OF EXIT ACCESS TRAVEL
FLOW OF PEOPLE
DIRECTION OF EXIT ACCESS TRAVEL
EXIT SIGNS
EXIT
DIRECTION OF EXIT ACCESS TRAVEL

Figure 2-3

Figure 2-4

EXHIBIT 2-2

REFERENCES AND STANDARDS

National Fire Protection Association Codes and Standards

NFPA-101, Life Safety Code

OSHA General Industry Standards

1910.35, Definitions

1910.36, General Requirements

1910.37, Means of Egress, General

1910.156, Fire Brigades

1910.165, Employee Alarm Systems

US Postal Service Documents

Employee and Labor Relations Manual Chapter 8

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

USPS documents and directives are requisitioned from area supply centers on Form 7380 Supply Center Requisition.

NFPA publications are available from:
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269-9101

CHAPTER 3

FLAMMABLE AND COMBUSTIBLE MATERIALS

310 GENERAL

311 Scope

This chapter identifies and consolidates selected parts of OSHA standards and NFPA regulations pertaining to the storage, handling, and dispensing of flammable and combustible materials, service station and spray application operations. For more detailed information or to resolve specific problems regarding flammable and combustible materials refer to NFPA and OSHA standards listed in Exhibit 3-2.

This chapter does not apply to ordinary combustibles such as wood and paper, but does apply to materials such as propane, gasoline, and paint dusts.

312 Purpose

This chapter provides USPS personnel with basic information as to storage, handling and dispensing of flammable and combustible materials in all postal owned or postal leased buildings. Exhibit 3-1, "Checklist for Flammable Liquids Storage Room Safety," is a brief summary of requirements for safe storage and handling of flammable liquids.

EXHIBIT 3-1

CHECKLIST FOR FLAMMABLE LIQUID STORAGE ROOM SAFETY

(Refer to NFPA 30 Flammable and Combustible Liquids Code for details)

1. Maximum capacity of storage room not exceeded.
2. Aisles clear (main aisle at least 36" wide).
3. Ventilation OK (if forced air, check blowers, motors, switches).
4. Explosion proof switches intact, guards on all fixtures inside of storage rooms.
5. Fusible links intact on self-closing doors.
6. Self-closing doors operational, sills intact.
7. Grounding integrity to earth ground.
8. Provision for bonding to containers being filled.
9. Approved faucet or pump on each drum being drained.
10. Approved drip can under each drum faucet (check liquid level in can, empty as necessary).
12. Approved filler/vent on each drum being filled.
13. Sprinkler system operational.
14. Floor clean of drips, spills, trash.
15. Required cautionary signs in place and legible.
16. Type I safety cans for receiving liquids from drums available and in use throughout the plant.
17. Flexible hose attachments for easy pouring from Type I containers.
18. Fill vent and funnel to provide venting of waste disposal drums and safe, convenient emptying of small containers into the drums.

313 Mailability and Transportation

This chapter does not apply to the transportation or mailability of flammable and combustible materials. These requirements are contained in appropriate U.S. Department of Transportation regulations (49 CFR); in NFPA-385, Recommended Regulatory Standard for Tank Vehicles for Flammable and Combustible Liquids, USPS HBK EL-812, Hazardous Materials, and Publication 52, Acceptance of Hazardous, Restricted or Perishable Matter.

314 Oil Burning Equipment

Storage, handling, or use of fuel oil tanks and containers connected with oil burning equipment are covered separately in American Society of Mechanical Engineers (ASME) and NFPA standards.

315 Material Safety Data Sheets

Material Safety Data Sheets (MSDS) (also called OSHA Form 20) serve as a reference for clarifying hazardous materials and determining necessary fire protection measures. MSDSs are usually supplied by the manufacturer or supplier, and should be kept on file for easy reference.

320 DEFINITIONS

321 Approved (Labeled or Listed)

Said of a code, standard, device, or item of equipment that is sanctioned, endorsed, accredited, certified, listed, labeled, or accepted by a duly constituted and nationally recognized authority or agency as satisfactory for use in a specified manner (such as Underwriter's Laboratories and Factory Mutual approved).

322 Boiling Point

The point at which a liquid at a pressure of 14.7 pounds per square inch absolute (psia) boils. The boiling point of the liquid is the temperature of the liquid at which its vapor pressure equals the atmospheric pressure. The lower the boiling point of the material the greater the vapor pressure and, consequently, the greater the fire potential.

323 Flash Point

The minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitible mixture with air near the surface of the liquid (as specified by appropriate test procedure).

324 Combustible Liquids

324.1 Kinds of Combustible Liquids

Combustible liquids having a flash point at or above 100°F are subdivided as follows:

a. Class II liquids include those having a flash point at or above 100°F and below 140°F. Examples of Class II liquids are #2 fuel, kerosene, and acetic acid.

b. Class IIIA liquids include those having a flash point at or above 140°F and below 200°F. An example of a Class IIIA liquid is #6 fuel oil.

c. Class IIIB liquids include those having a flash point at or above 200°F. Examples of Class IIIB liquids are lubricating oils, paraffin, and tar.

324.2 Mixing Materials

Requirements for the safe storage and use of the great variety of flammable and combustible materials commonly available depend primarily on their fire characteristics, particularly the flash point. It should be noted that the classification of a material can be changed by contamination. For example, filling a Class III liquid into a tank previously containing a Class II liquid can alter its classification. Care must be exercised in such cases to apply the requirements appropriate to the actual classification.

324.3 Classification

The volatility of materials is increased by heating. If Class II or Class III materials are heated above their flash point, ventilation may have to be increased and/or electrical classification changed in the affected area.

325 Container

Any vessel of 60 U.S. gallons or less capacity used for transporting or storing liquids.

326 Fire Area

An area of a building separated from the remainder of the building by construction having a fire resistance of at least 1 hour, the communicating openings of which are properly protected by an assembly having a fire resistance rating of at least 1 hour. Such construction must completely separate the area from all other building portions with fire resistant construction from the floor through the roof completely enclosing the area.

327 Flammable Liquid

327.1 Class I Liquid

A Class I liquid is a liquid having a flash point below 100°F and a vapor pressure not exceeding 40 psia at 100°F.

327.2 Other Liquids

Other flammable liquids are subdivided as follows:

a. Class IA includes those having a flash point below 73°F and a boiling point below 100°F. Examples of Class IA liquids are ethyl ether and propane (under pressure).

b. Class IB includes those having a flash point below 73°F and a boiling point at or above 100°F. Examples of Class IB liquids are carbon disulfide, ethanol, and gasoline.

c. Class IC includes those having a flash point at or above 73°F and below 100°F. Examples of Class IC liquids are VMP naptha, styrene monomers, and turpentine.

328 Safety Can

An approved container, of not more than five U.S. gallons capacity, that has a spring closing lid and a spout cover and is designed to safely relieve internal pressure when subjected to fire.

329 Service Station

An automotive service station where motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles. Service stations include any facility available for the service of tires, batteries, accessories, and automotive maintenance work.

330 INSIDE STORAGE

331 General

This section applies to the incidental storage of flammable and combustible materials in postal owned and postal leased buildings. Lubricating oil, for example, is stored internally.

332 Containers and Uses

Flammable and combustible materials must be stored in approved tanks or containers. If the material is used outside of an inside storage room, or a storage cabinet in a building, or in any one fire area of a building, the quantity must not exceed the following:

a. 25 gallons of Class IA materials in approved containers.

b. 120 gallons of Class IB, IC, II, or III liquids in containers.

c. 660 gallons of Class IB, IC, II, or III liquids in a single portable tank.

333 Separation and Protection

Areas where flammable and combustible materials are transferred from one tank or container to another must be separated from other operations or processes in the building by either adequate distance or by construction having adequate fire resistance. Drainage or containment must be provided to control spills. Do not drain materials into any sewer system. Adequate natural or mechanical ventilation must be provided.

334 Storage Cabinets

334.1 Location

Not more than 120 gallons of Class I, Class II, and Class IIIA materials may be stored in an approved storage cabinet in any postal owned or postal leased building. Of this total, not more than 60 gallons may be Class I and Class II materials, and not more than three such storage cabinets may be located in a single fire area. However, more than three cabinets may be located in the same fire area if the additional cabinet or group of not more than three cabinets is separated from other cabinets by at least 100 feet (see figures 3-1 and 3-2 for details).

334.1 Design and Construction of Storage Cabinets

334.21 Requirements

Storage cabinets must be designed and built so that internal temperature at the center, 1 inch from the top, does not exceed more than 325°F when subjected to a 10-minute fire test. Storage cabinets for flammable and combustible materials must be labeled in conspicuous lettering, "FLAMMABLE - KEEP FIRE AWAY". Only approved storage cabinets may be used in postal owned and postal leased buildings (see figure 3-3).

334.22 Venting

Some building codes mandate that the interior of the storage cabinet be vented to minimize the accumulation of vapors. Accordingly, some manufacturers provide cabinets with knockouts that allow venting. However, venting a storage cabinet may defeat the purpose of protecting any container of flammable or combustible liquid from involvement in a standard room fire for up to 10 minutes, the estimated time for a particular room or area to become involved in a fire. When storage cabinets are provided with vents by manufacturers, the vents must be plugged unless local codes mandate otherwise.

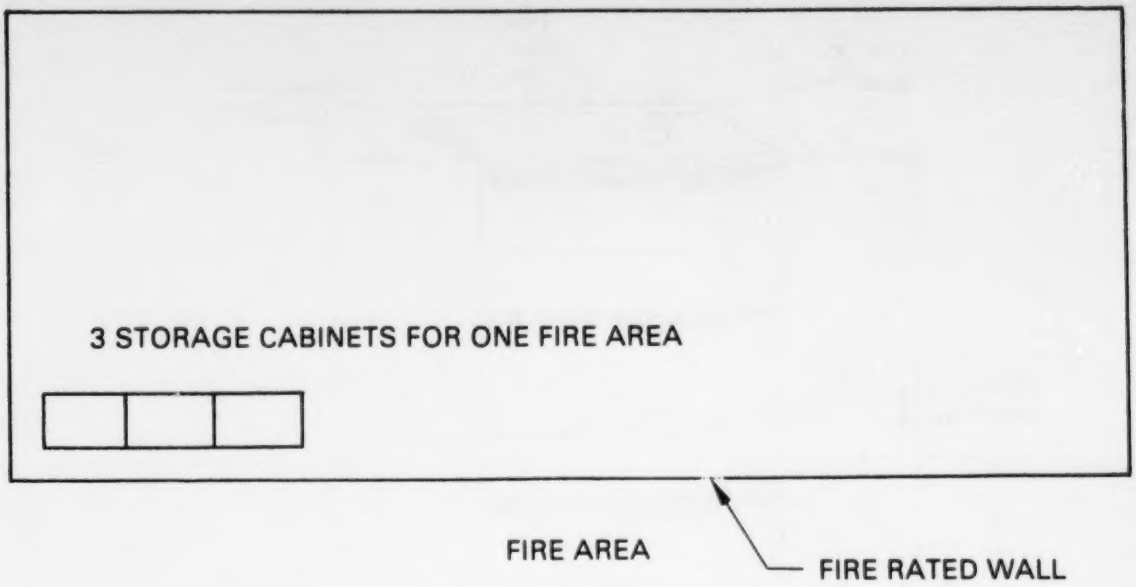


Figure 3-1

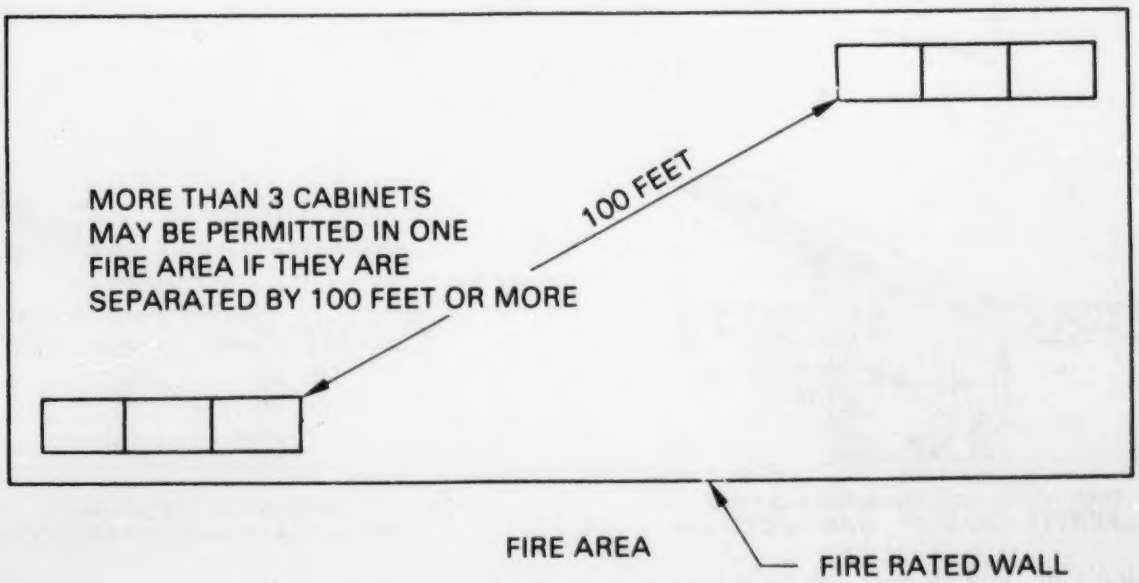


Figure 3-2

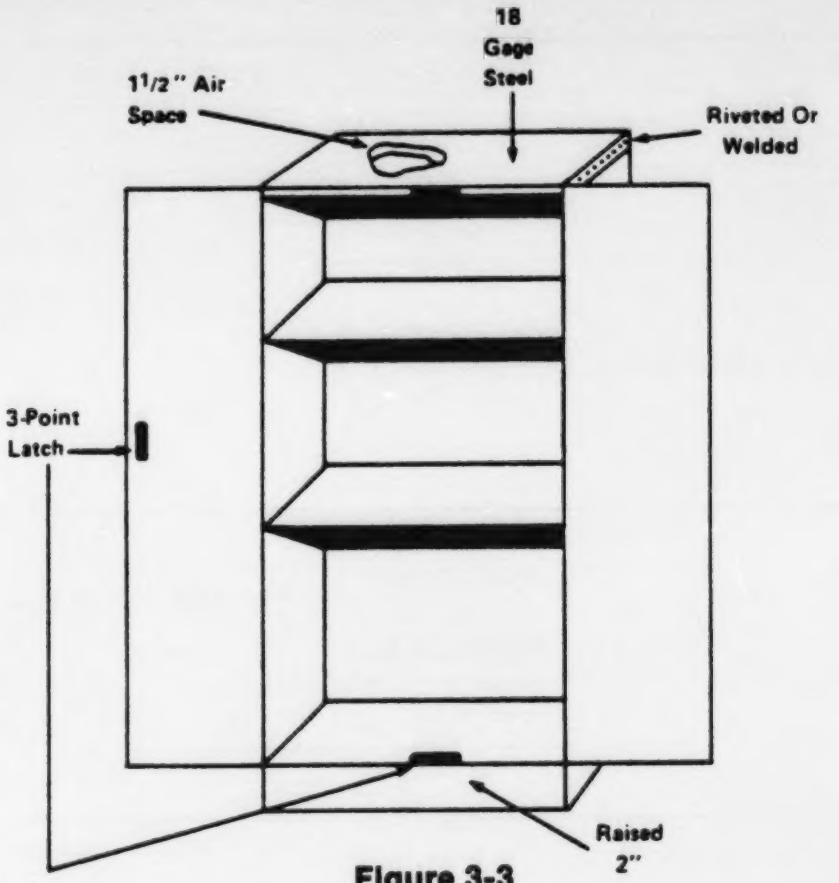
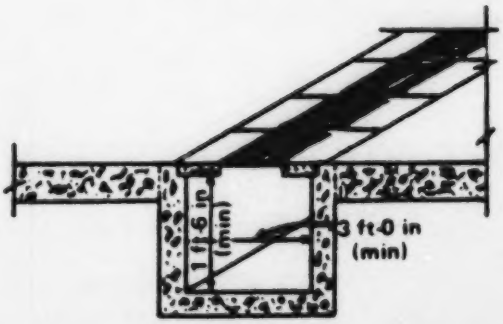
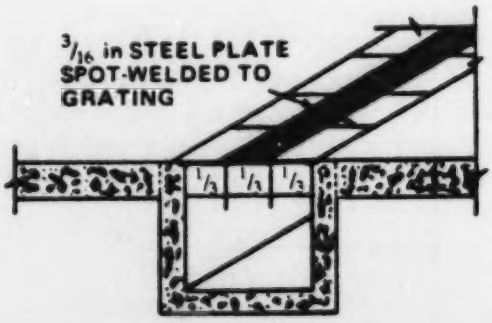


Figure 3-3



DRAINAGE TRENCH WITH PRECAST CONCRETE AND STEEL GRATING COVER



DRAINAGE TRENCH WITH STEEL PLATE AND GRATING COVER

SI Units: 1 in. = 25.4 mm; 1 ft = 0.3048 m.

Figure 3-4

335 Storage Rooms

335.1 General Requirements

Inside storage rooms for flammable and combustible materials are permitted in postal owned and postal leased buildings only if the storage rooms meet selected fire resistance ratings given in NFPA standards (see Exhibit 3-2). Floors, and where floors join walls, must be liquid tight, except for trap drains. Where an automatic fire protection system is provided, the system must be designed and installed in accordance with the appropriate NFPA standard for the type of protection system installed (see Chapters 8 and 9).

335.2 Doors

Approved fire-rated doors are required for all openings in interior walls to adjacent rooms or areas of inside storage rooms. Interior walls with a fire resistance rating of 2 hours or less must be provided with approved fire doors having a 1 1/2 hour fire resistance rating. If interior walls are required to have greater than a 2-hour fire resistance rating, the approved fire doors must be compatible with the wall rating. It is recommended that doors be kept closed at all times.

335.3 Sills or Ramps

Noncombustible sills or ramps at least 4 inches in height, or otherwise designed to prevent the flow of liquids to adjoining areas, must be provided in inside storage rooms. An open grated trench across the width of the opening inside of the room is a viable alternative, if it drains to a safe location, see figure 3-4 for more details for drain trenches. If an open grated trench is used, it must extend across the entire opening (door) into the room and must be located on the inside of the room. The trench must also be designed to drain the collected spilled liquid to a safe location. This method may be desirable if there is an extensive need to transfer large quantities of flammable liquids in and out of the room with hand trucks.

335.4 Wood

Wood of at least 1-inch nominal thickness may be used for shelving, racks, dunnage, scuffboards, floor overlay, and similar applications. Although wood increases the potential for fire in the room, it does minimize the chances of mechanical damage and sparks.

335.5 Quantities

Storage in inside rooms must comply with Table 3-1.

335.6 Ventilation

Every inside storage room must have either a gravity or a mechanical exhaust ventilation system. Such a system must provide for a complete change of air within the room at least 6 times per hour. If a mechanical system is used to exhaust air, it must be controlled by a switch located outside of the room and

FIRE [1] PROTECTION PROVIDED	FIRE RESISTANCE	MAXIMUM SIZE	TOTAL ALLOWABLE QUANTITIES (GALS. / SQ. FT. / FLOOR AREA)
YES	2 HOURS	500 SQ. FT.	10
NO	2 HOURS	500 SQ. FT.	5
YES	1 HOUR	150 SQ. FT.	4
NO	1 HOUR	150 SQ. FT.	2

[1] FIRE PROTECTION SYSTEM SHALL BE SPRINKLER, WATER SPRAY, CARBON DIOXIDE, OR OTHER SYSTEM.

Table 3-1

CLASS	CONTAINER STORAGE-MAX. PER PILE		PORTABLE TANK STORAGE MAX. PER PILE GALLONS		DISTANCE BETWEEN PILES OR RACKS (FT)	DISTANCE TO PROPERTY LINE THAT CAN BE BUILT UPON (FT)	DISTANCE TO STREET, ALLEY, OR A PUBLIC WAY (FT)
	GALLONS	HEIGHT (FT)	GALLONS	HEIGHT (FT)			
IA	1,100	10	2,200	7	5	50	10
IB	2,200	2	4,400	14	5	50	10
IC	4,400	12	8,800	14	5	50	10
II	8,800	12	17,600	14	5	25	5
III	22,000	18	44,000	14	5	10	5

Table 3-2

near to the door. The ventilating equipment and any lighting fixtures must be operated by the same switch. A pilot light must also be installed adjacent to the switch. If gravity ventilation is provided, the fresh air intake, as well as the exhaust outlet from the room, must be on the exterior of the building in which the room is located.

335.7 Control of Ignition Sources

Precautions must be taken to prevent the ignition of flammable vapors. Sources of ignition include, but are not limited to, open flames, smoking, cutting and welding, hot surfaces, frictional heat, static, electrical and mechanical sparks, spontaneous ignition, radiated heat, and chemical reactions.

335.8 Fire Control

At least one multipurpose dry chemical portable fire extinguisher with a rating of not less than 20-B must be located outside of, and not more than 10 feet from, each door opening that leads into an inside storage room.

NOTE

Numerals are used with the identifying letters for extinguishers labeled for Class A and B fires. The "numeral" indicates the relative extinguishing effectiveness of the device.

340 OUTSIDE STORAGE

341 Consideration

If it is necessary for any postal installation to maintain large quantities of flammable and combustible materials, outside storage should be considered. Storage of materials outside of buildings must be in accordance with Table 3-2.

342 Mixed Storage

When two or more classes of materials are stored outside in a single pile, the maximum gallonage in that pile must be no greater than the maximum gallon allowance for the most hazardous material in the pile.

343 Maximum Storage

A maximum of 1,100 gallons of flammable and combustible materials may be located adjacent to buildings.

344 Spill Containment

The outside storage area must be graded in a manner to divert spills away from buildings and other exposures or must be surrounded by a curb at least 6 inches high. When curbs are used, provisions must be made for draining accumulations of ground water, rain water, or liquid spills. Drains must end at a safe location and must be accessible to operation in a fire.

345 Security

The storage area must be protected to prevent against tampering or trespassers and must be kept free of weeds, debris, and the accumulation of combustible materials.

346 Fire Control

At least one multipurpose dry chemical portable fire extinguisher having a rating of not less than 12-B must be located not more than 10 feet away from the storage area. Open flames, smoking, and hot work are prohibited within 50 feet of the outside storage area, and appropriate signs must be installed.

350 HANDLING MATERIALS

351 Scope

The following general provisions apply to the dispensing of flammable and combustible materials in all postal owned and postal leased buildings.

352 Covered Containers

Class I and Class II materials must be kept in approved covered containers when not in use. Covered containers must be sealed by means of a lid or other device that prevents liquid or vapor from escaping at ordinary temperatures.

353 Spills and Leakage

If flammable and combustible materials are used or handled, means must be provided to properly absorb or contain spills or leaks, and to properly dispose of residual materials.

354 Dispensing

Precautions must be taken to prevent ignition of vapors during dispensing of flammable and combustible materials. Class I and Class II liquids must be drawn from, or transferred into, vessels, containers, or portable tanks only from the following:

a. Original shipping container with a capacity of five gallons or less.

b. From safety cans.

c. Through a closed piping system or from a portable tank or container by means of an approved and listed device drawing through an opening in the container or tank.

d. By gravity through a listed self-closing valve or self-closing faucet.

NOTE

Transferring materials by means of pressurizing the container is prohibited.

355 Drip Cans

A safety drip can, or pan capable of containing at least one gallon, should be positioned below each drum faucet to catch spills or drips. Drip cans must be approved, lidless, and have a perforated fire baffle over the opening. All drip cans and pans must be emptied at least daily. At least 50 pounds of absorbent material must be available in each storage area.

356 Vents

It is recommended to install approved and listed, pressure/vacuum vents on all drums in which a self-closing valve or faucet has been installed.

357 Labeling

All containers and portable tanks containing flammable and combustible materials must be labeled as to their contents. Any safety can or other container of flammable liquids having a flash point at or below 80oF must be painted red with additional, clearly visible identification of the contents, conspicuously stenciled or painted in yellow.

358 Grounding and Bonding

Adequate precautions must be taken to prevent ignition of flammable vapors. Class I liquids must not be dispensed into containers unless the nozzle and container are electrically interconnected. If the metallic floor plate on which the container stands while filling is electrically connected to the fill stem, or if the fill stem is bonded to the container during filling operations by means of a bond wire, the provisions of this section will have been complied with. Bonding wire should be 10 gauge and stranded, clamps should be screw-type.

360 SERVICE STATIONS

361 General

The dispensing, storing and transferring of flammable and combustible materials is an inherent part of postal fleet operations. This section contains specific provisions for automotive service stations where fuel is pumped into postal vehicles. These are general provisions only. For more detailed information refer to NFPA and OSHA standards (see Exhibit 3-2).

362 Storage

Flammable and combustible materials must be stored in approved closed containers, underground tanks, specially enclosed tanks, or in above ground tanks. No Class I liquids may be stored within any service station building except in closed containers of an aggregate capacity not to exceed 120 gallons.

363 Piping, Valves, and Fittings

Only approved and listed piping, valves and fittings may be used.

364 Pumps

Only approved and listed pumps may be used. Pumps installed above ground, outside of buildings, must be located not less than 10 feet from any adjoining property or buildings. All pumps must be anchored and protected against physical damage by mounting on concrete islands and barricades. The pump must be provided with a control device allowing the pump to operate only when the nozzle is removed from its bracket and the device is manually activated. This control device must also stop the pump when the nozzle has been returned to the bracket. The dispensing hose must not exceed 50 feet in length, and must have a listed, automatic closing type nozzle with or without a latch-open device.

365 Vapor-Recovery Systems

Existing pumps may be modified for vapor recovery; or whenever a pump is replaced, a vapor-recovery system must be provided. All newly constructed automotive service stations on postal owned or postal leased installations must be provided with an approved vapor-recovery system.

366 Emergency Power Shutoff

To shut off power in an emergency, clearly identified and easily accessible switch(es) or circuit breaker(s) must be provided at a remote location from dispensing pumps, but not more than 100 feet. A sign must be posted indicating where the shutoff switch is located. The shutoff switch must not be blocked by storage of materials. Attendants and pump operators must know the location of the emergency shutoff switch.

367 Control of Ignition Sources

Smoking, or open flames, within 25 feet of all areas used for fueling, storage, or dispensing Class I liquids is prohibited. Signs prohibiting smoking must be posted so as to be readily visible from various directions. The motors of all vehicles being fueled must be shut off.

368 Fire Control

Each service station must be provided with at least one approved fire extinguisher having a minimum classification of 12-B:C. Each extinguisher must be located within 50 feet of each pump, dispenser, fill pipe opening, storage, lubrication, or service room.

370 SPRAYING FLAMMABLE AND COMBUSTIBLE MATERIALS

371 General

This section refers to the spraying of flammable or combustible materials by compressed air, "airless", "hydraulic atomization", steam, electrostatic

methods, or any other method in a continuous or intermittent process. This section covers only the minimum requirements to assure reasonable safety under normal conditions. This section does not apply to outdoor spraying of buildings, tanks, or other structures.

372 Spraying Area

The spraying area is any area of a building where dangerous quantities of flammable vapors or mists, combustible residues, dusts, or deposits are present due to the spraying. The spraying area includes the interior of spray booths and rooms, the interior of ducts exhausting from the spraying area, and any area in the direct path of spraying.

373 Design and Construction

Spray booths must be designed and constructed in accordance with applicable OSHA and NFPA standards. At the minimum, spray booths must be substantially constructed of securely and rigidly supported steel, concrete, or masonry. Aluminum or other substantial, noncombustible materials may be used for intermittent or low volume spraying. Spray booths must be designed to sweep air currents toward the exhaust outlet. The interior surfaces of spray booths must be smooth and continuous without edges and must be designed to prevent pocketing of residues and to ease cleaning. Floor surfaces must be noncombustible material and easy to clean. If baffle plates are installed to promote an even airflow or to trap overspray, the plates must be of noncombustible material, readily removable, and easy to clean. Baffle plates must not be located in the exhaust ducts.

374 Cleaning

All portions of spray booths must be easy to clean.

375 Sources Of Ignition

All electrical equipment, open flame, and other sources of ignition must conform to the requirements found in applicable NFPA and OSHA standards.

376 Sprinkler Heads

Sprinklers protecting spraying areas must be cleaned and protected against overspray residue. Polyethylene or cellophane plastic bags having a thickness of 0.003 inches or thinner, or thin paper bags may be used to protect the sprinkler head. The bags must be replaced and heads cleaned frequently so that heavy deposits of residue do not accumulate.

377 Ventilation

Ventilation and exhaust systems must be in accordance with applicable NFPA standards. All spraying operations in postal owned and postal leased buildings must be provided with mechanical ventilation adequate to remove flammable vapors, mists, or powders to a safe location, and to confine and control

combustible residues. Consult the OSHA standards in Exhibit 3-2 for additional requirements regarding velocity, airflow, makeup air, and the required number of air changes.

378 Operations and Maintenance

378.1 Spray Area

Spraying must not be conducted outside of predetermined spraying areas; however, operation of small portable spraying apparatus for spraying building interiors and similar uses is allowed.

378.2 Ventilation

Adequate ventilation must be provided at all times when conducting indoor spraying operations, particularly in small enclosures.

378.3 Open Fires

Spraying must not be conducted in the vicinity of open flames or other sources of ignition.

378.4 Containers

When they are not required to be open to replenish the supply of such material, cans or other containers of paints, thinners, or other protective coatings should be kept tightly closed at all times.

378.5 Rags

Because of the danger of spontaneous ignition, oily or paint-laden rags or waste must be stored in closed metal waste cans and disposed of at the end of each day's operations.

378.6 Residue

Paint residue powder can cause spontaneous combustion. Therefore the residue must be stored in closed metal cans, and all spraying areas must be kept as free as practical from the accumulation of deposits of combustible residues.

378.7 Tools

Only nonsparking tools may be used in the spraying area or for cleaning purposes.

378.8 Signs

"No Smoking" signs must be posted in all spraying areas.

378.9 Filters

Check and replace as necessary all filters.

EXHIBIT 3-2

REFERENCES AND STANDARDS

National Fire Protection Association (NFPA) Standards

NFPA-30, Flammable and Combustible Liquids Code

NFPA-33, Spray Application of Flammable and Combustible Materials

NFPA-80, Fire Doors and Windows

NFPA-251, Fire Tests of Building Construction and Materials

NFPA-321, Classification of Flammable and Combustible Liquids

NFPA-325M, Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids

NFPA-49, Hazardous Chemical Data

NFPA-91, Blower and Exhaust System

NFPA, Fire Protection Handbook, 15th Edition

OSHA General Industry Standards

1910.94 Ventilation

1910.106, Flammable and Combustible Liquids

1910.107, Spray Finishing Using Flammable and Combustible Materials

US Postal Service Documents

HBK EL-812, Hazardous Materials

Publication 52, Acceptance of Hazardous, Restricted or Perishable Matter

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

USPS documents and directives are requisitioned from area supply centers on Form 7380 Supply Center Requisition.

NFPA publications are available from:
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269-9101

CHAPTER 4

PORTABLE FIRE EXTINGUISHERS

410 GENERAL

411 Scope

This chapter applies to the classification of fires and fire extinguishers, and to the proper selection, installation, inspection, maintenance and testing of the portable fire extinguishing equipment used in postal owned and postal leased facilities. These requirements are minimum. Portable fire extinguishers are intended for use by employees with a limited amount of training as a first-line defense against incipient fires. Portable extinguishers are needed in addition to automatic systems and fixed protection equipment.

412 Purpose

This chapter provides maintenance and safety personnel with sufficient information to select, purchase, install, and maintain portable fire extinguishers. For more detailed information regarding portable extinguishers consult NFPA standards (see Exhibit 4-1).

420 THE COMBUSTION PROCESS

421 The Fire Triangle

The "fire triangle" is a three-sided figure that has been used to explain and describe fire combustion and extinguishment. The triangle (see figure 4-1) illustrates that oxygen, heat, and fuel, in proper proportions, create a fire and that if any one of the three elements is removed a fire cannot exist.

422 The Fire Tetrahedron

In recent years, many new chemicals and materials have been produced that burn and react in a manner that is not explained completely by the use of the fire triangle. There have been several theories to address this problem. The "fire tetrahedron" is the one most generally accepted (see figure 4-2). The tetrahedron is a transition from the plane geometric triangle to a four-sided solid geometric pyramid. One of the four sides serves as a base and represents the chemical chain reaction. The three standing sides of the pyramid represent heat, fuel, and oxygen. This theory has not done away with the fire triangle, it has simply added a fourth component or condition.

430 CLASSES OF FIRES

431 General

Fire extinguishers are designed to extinguish fires involving various types of fuels. Fires are classified as A, B, C, or D or in combination.

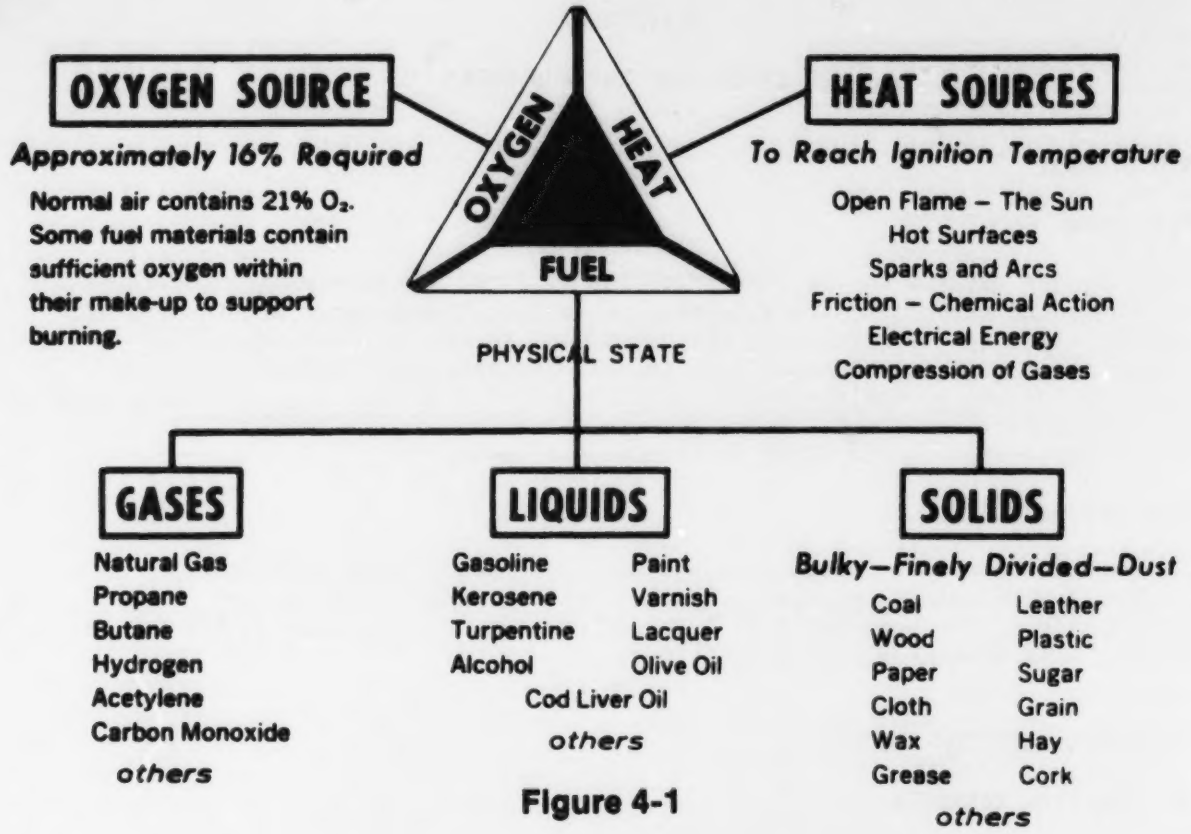


Figure 4-1

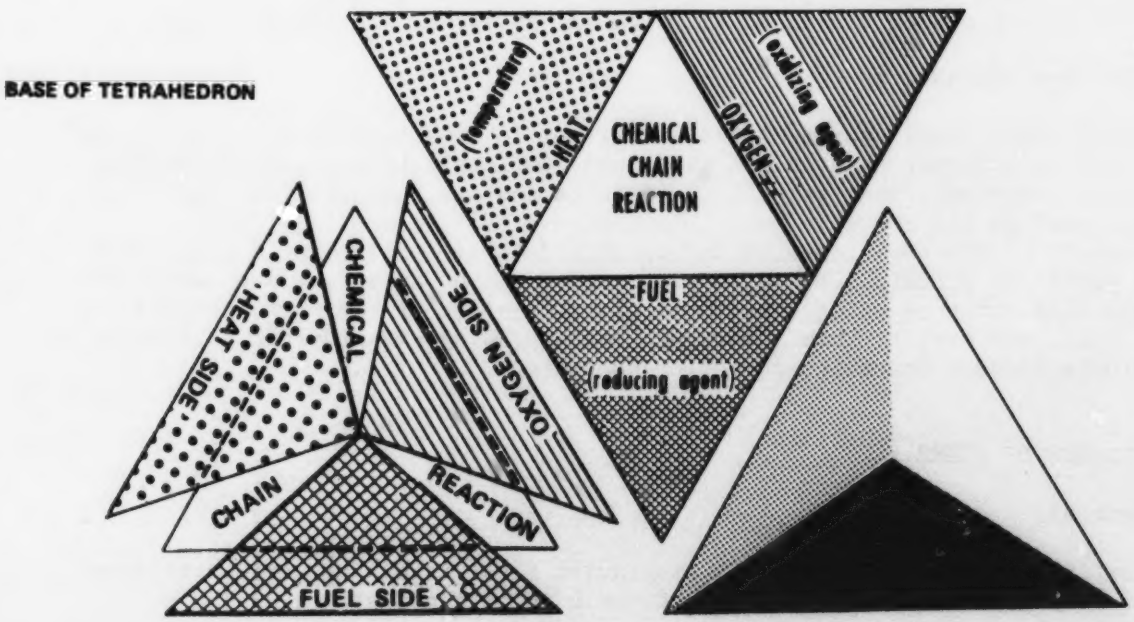


Figure 4-2

432 Class A Fires

Class A fires are fires in ordinary combustible materials (wood, paper, cloth, plastics, rubber). Class A fires are extinguished by the heat absorbing effects of water, certain dry chemicals which retard combustion, or other agents which interrupt the chain reaction of fire development. Class A fires normally undergo surface burning and leave glowing embers and ashes.

433 Class B Fires

Class B fires are fires in flammable or combustible liquids (oil, kerosene, gasoline), flammable gases (acetylene, propane), and similar materials (naptha, paint, styrene), that are extinguished by excluding oxygen, inhibiting the release of combustible vapors, or by interrupting the combustion chain reaction.

433 Class C Fires

Class C fires are fires in live electrical equipment and exposed metal surfaces where an electrical shock hazard exists (blower motors, control panels, conveyor motors, batteries, transformers, and generators). Extinguishers for Class A or B fires may be used if the electrical equipment has been safely deenergized. Water type extinguishers must not be used on energized electrical equipment fires.

435 Class D Fires

Class D fires are fires in certain combustible metals (magnesium, titanium, zirconium, etc.) that are extinguished by a heat absorbing agent that does not react with the burning metal. Generally, inert materials such as sand or dry powder are used to smother such fires.

440 EXTINGUISHER LABELING, NUMBERING, AND TAGGING

441 Conventional Labeling

Conventional labels for portable fire extinguishers are as follows:

a. Class A extinguishers are identified by a green triangle containing the letter A (see figure 4-3).

b. Class B extinguishers are identified by a red square containing the letter B (see figure 4-3).

c. Class C extinguishers are identified by a blue circle containing the letter C (see figure 4-3).

d. Class D extinguishers are identified by a yellow star containing the letter D (see figure 4-3).

e. Multipurpose extinguishers are designed for use on more than one class of fire. They are identified by multiple symbols placed in a horizontal sequence on the front of the extinguisher shell immediately visible to the user (see figure 4-3).

Figure 4-3

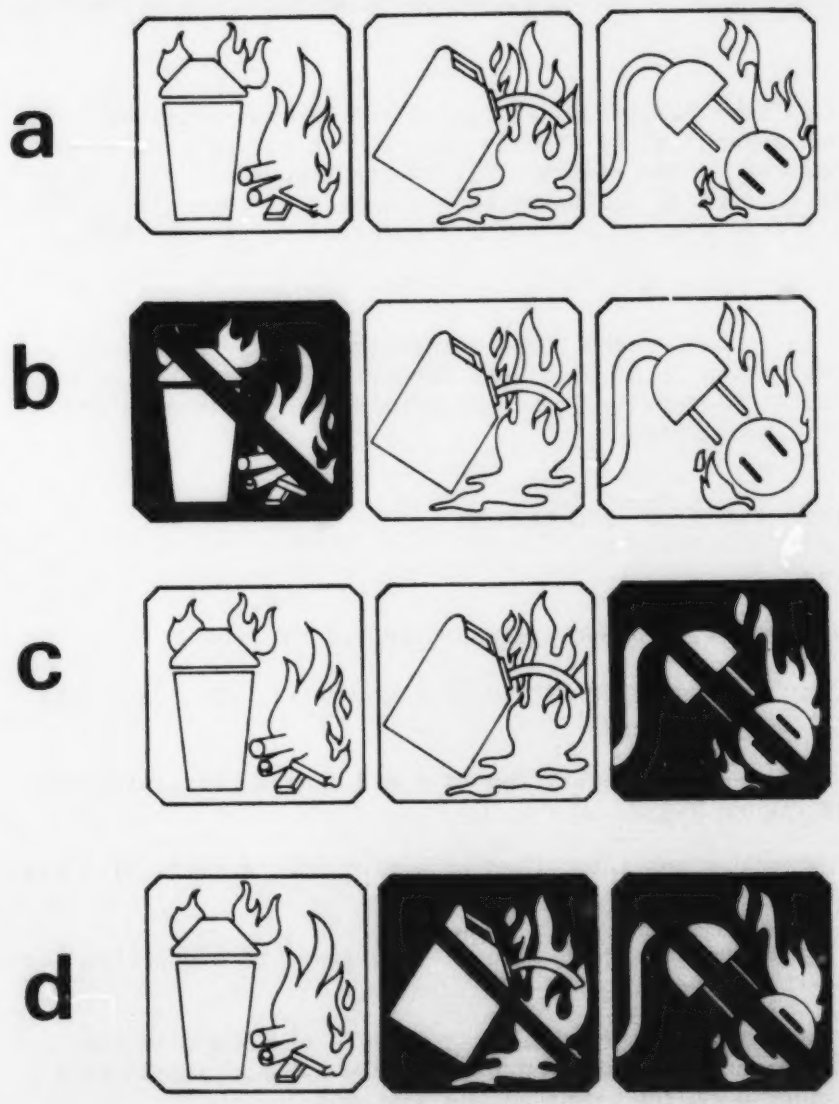


Figure 4-4

442 Pictographic Labeling

The pictograph system is the most recently recommended labeling system. It combines pictographs of both uses and nonuses on a single label. The new pictographs are designed so that their proper use may be determined at a glance. When an application is prohibited, the background is black and the slash is bright red. Otherwise the background is light blue. Row "a" indicates an extinguisher for Class A, B, and C fires. Row "b" indicates an extinguisher for Class B and C fires. Row "c" indicates an extinguisher for Class A and B fires. Row "d" indicates an extinguisher for Class A fires. Conversion to this method is recommended (see figure 4-4).

443 Numbering

Location numbers must be applied to all extinguishers and the red background where the extinguisher is mounted to ensure accurate service and adequate inventory records. In multifloor structures, the extinguisher number may be prefixed by the floor designation.

444 Tagging

Form 4705, Fire Inspection Tag, must be fixed to each portable extinguisher. Complete all information required on each tag. Use the reverse side of the tag for recording monthly inspections (see figures 4-5 and 4-6).

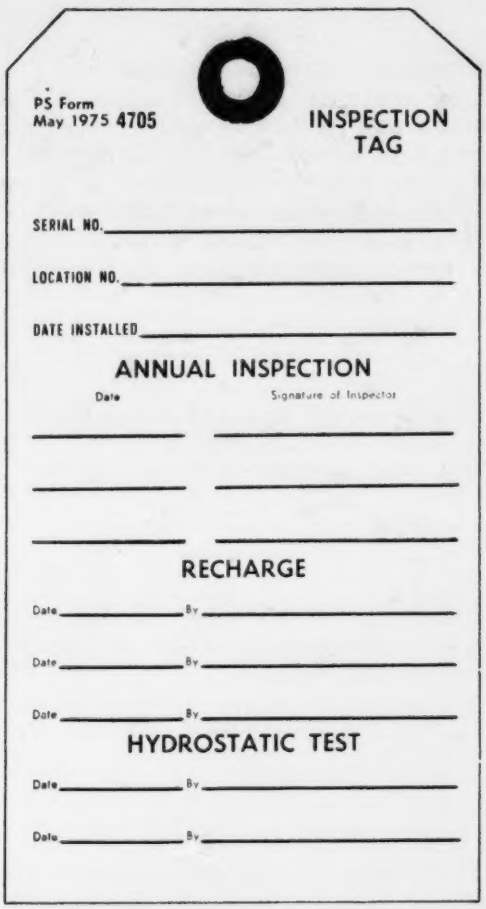
450 MOUNTING EXTINGUISHERS

451 Wall Mounted

Specific mounting heights based on the weight of the portable extinguisher are no longer required. Extinguishers must be available when needed and employees must not be subjected to injury when obtaining an extinguisher. If the possibility of damage to an extinguisher exists from rolling equipment, hampers, trucks, etc., suitable guards must be provided. The locations of extinguishers must be immediately visible from several different directions. Access to extinguishers must be maintained at all times. Floor areas below the extinguisher and their approaches must be kept free of materials, and red lines must be applied to the floor. A solid red rectangle must be applied to the wall behind the extinguisher, extending at least six inches beyond each side of the extinguisher. In USPS workrooms, if the extinguisher is not readily visible from several directions, an additional rectangle at least 12 inches wider than the extinguisher must be painted on the wall above the extinguisher at least 12 feet from the floor. Use additional directional signs where necessary.

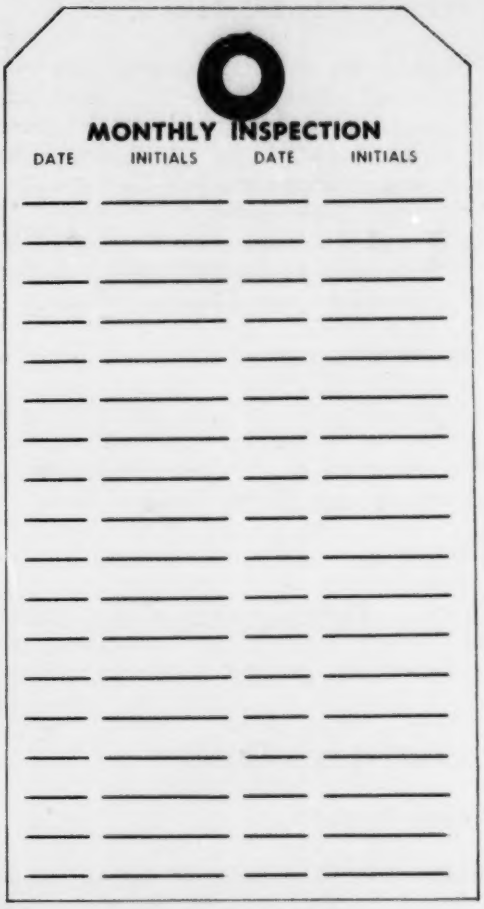
452 Column Mounted

In USPS workrooms the location of column mounted extinguishers is indicated by a solid red band extending six inches above and below the extinguisher, encircling the column. If the location of the extinguisher cannot be immediately determined or is not readily visible from several directions, a red band at least 6 inches wide must be applied to the column at least 12 feet from the floor, encircling the column. Use additional directional signs where necessary.



Front

Figure 4-5



Back

Figure 4-6

460 SELECTION AND DISTRIBUTION OF PORTABLE EXTINGUISHERS

461 Selection

Due to the classification of potential workroom or office area hazards, the type of extinguisher to use in a given situation must be determined by the character of the fires anticipated, the surrounding construction, ambient temperatures, and other hazards. For general use, ABC multipurpose dry-chemical extinguishers are recommended. ABC dry-chemical extinguishers must be a minimum of 10 pounds in size. Where Class B and C fires are anticipated, carbon dioxide (CO_2) extinguishers are recommended. For sensitive electronic or computer equipment, Halon 1211 portable extinguishers are recommended.

462 Distribution

It is the policy of the Postal Service to distribute portable fire extinguishers, regardless of size or class, so that the maximum travel distance to any extinguisher does not exceed 50 feet. This includes elevated work platforms, conveyor walkways, and catwalks.

470 OBSOLETE EXTINGUISHERS

All soldered or riveted shell, self-generating soda acid, self-generating foam, and gas cartridge water type portable extinguishers operated by inverting the extinguisher to rupture the cartridge or to initiate an uncontrollable pressure generating chemical reaction to expel the agent are prohibited for use in any postal owned or postal leased building and MUST BE REMOVED FROM SERVICE (see figure 4-7).

480 INSPECTION, MAINTENANCE, AND TESTING PORTABLE EXTINGUISHERS

481 Inspection

481.1 Monthly Inspection

The monthly inspection of portable extinguishers is a visual check to ensure the extinguisher is available and will operate. All portable extinguishers must be visually inspected monthly. Form 4705 must be signed by the inspector upon completion. At the minimum, monthly inspections ensure the following:

a. The proper extinguisher is in its designated place and correctly mounted. Appropriate signs are provided.

b. Access to, or visibility of, the extinguisher is not obstructed from several directions.

c. Operating instructions are on the extinguisher nameplate, are legible, and face outward.

d. Seals, tags, or tamper indicators are not missing or broken.

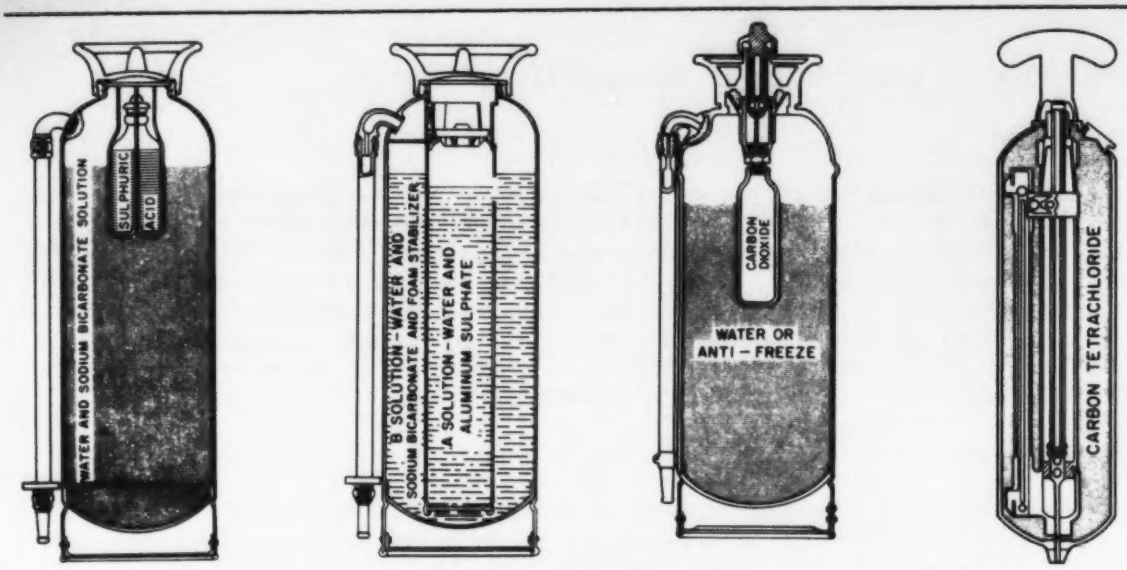

SULPHURIC ACID
WATER AND SODIUM BICARBONATE SOLUTION
'B' SOLUTION - WATER AND SODIUM BICARBONATE AND FOAM STABILIZER
'A' SOLUTION - WATER AND ALUMINIUM SULPHATE
CARBON DIOXIDE
WATER OR ANTI - FREEZE
CARBON TETRACHLORIDE

Figure 4-7

EXTINGUISHER TYPE	TEST INTERVAL (years)	
Soda Acid Cartridge operated water and/or antifreeze Stored pressure water and/or antifreeze Wetting agent Foam	}	Remove From Service
Loaded stream	5	
Dry chemical with stainless steel shells or soldered brass shells	5	
Carbon dioxide	5	
Dry chemical, stored pressure, with mild steel shells, brazed brass shells, or aluminum shells	12	
Dry chemical, cartridge operated, with mild steel shells	12	
Bromotrifluoromethane—Halon 1301	12	
Bromochlorodifluoromethane—Halon 1211	12	
Dry powder, cartridge operated, with mild steel shells[1]	12	

[1]Except for stainless steel and steel used for compressed gas cylinders, all other steel shells are defined as 'mild steel' shells

Table 4-1

e. Gauges and dials indicate the extinguisher is fully charged. Extinguishers without gauges and dials must be inspected according to the manufacturer's specifications.

f. There is no physical damage, corrosion, leakage, dents, or cracked or clogged nozzles.

481.2 Annual Maintenance Inspection

The annual maintenance inspection of a portable extinguisher is a thorough check to ensure that it will operate effectively and safely. It includes a thorough examination, any necessary repair or replacement, and hydrostatic testing when required. The procedures found in HBK MS-1, Operation and Maintenance of Real Property Appendix 13-B, for performing annual maintenance must be carefully followed. Stored-pressure extinguishers do not require internal examination. Stored-pressure dry chemical extinguishers that require a 12-year hydrostatic test must be emptied and subjected to applicable maintenance procedures every 6 years. Dry-chemical extinguishers having nonrefillable disposable containers are exempt from this requirement. When recharging or hydrostatic testing is performed, the 6-year requirement begins from that date.

482 Hydrostatic Testing

Hydrostatic testing must be performed only by persons who are properly trained, equipped, and qualified to perform this service. All portable extinguishers must be hydrostatically tested at the intervals listed in Table 4-1.

483 Contracted Maintenance Services

Fire extinguisher maintenance, particularly hydrostatic testing, is a specialized activity. Services for shell-pressure testing, recharging, or other maintenance on portable extinguishers is procured by the postmaster under local purchase authority in all buildings which are postal owned or leased.

490 REPLACEMENT OF EXTINGUISHERS

A cost comparison between the costs of hydrostatic testing and the purchase cost to replace the extinguisher must be performed. If the total cost of testing exceeds 60 percent of the acquisition cost of a replacement extinguisher, the old extinguisher should be discarded and a new extinguisher procured. Serviceable extinguishers designated for disposal due to costs may be used for training purposes. Property Management and Disposal Price Schedules are available in most regions and may be used as a guide in selecting a suitable testing organization. Contact the regional manager, Procurement Branch, for further information.

EXHIBIT 4-1

REFERENCES AND STANDARDS

National Fire Protection Association Codes and Standards

NFPA-10, Portable Fire Extinguishers

NFPA Fire Protection Handbook, Fifteenth Edition

OSHA General Industry Standards

1910.157 Portable Fire Extinguishers

US Postal Service Documents

Employee and Labor Relations Manual para. 373

HBK MS-1, Operation and Maintenance of Real Property

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

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NFPA publications are available from:
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Batterymarch Park
Quincy, MA 02269-9101

CHAPTER 5

HOT WORK FIRE PROTECTION

510 GENERAL

Hot work is maintenance work requiring use of tools or equipment that generate sparks, flame, or heat. This chapter covers the procedures to follow when performing hot work.

520 FIRE AND EXPLOSION POTENTIAL

Cutting, welding using electric arcs or oxy-fuel gas flames, chipping, or grinding presents a high potential for fire and explosion. Globules of molten metal and sparks can scatter as far as 35 feet, igniting a fire in many kinds of combustible materials. These globules and sparks can fall through cracks, pipe holes, or other openings in floors and partitions starting a fire that could reach serious proportions before being noticed. Prevention of these types of fires or explosions is achieved by separating these combustibles from ignition sources or by shielding.

530 APPROVAL

A designated management representative, usually the maintenance supervisor responsible for the work, must approve all hot work in advance of work assignment. Use of a hot work permit is required. When hot work is performed in a specific area designated and approved for such work, such as a maintenance shop, prior approval is not required. See Exhibit 5-1 for a suggested hot work permit.

540 LOCATION

541 Authorized Hot Work Areas

In a building, hot work may be done in:

a. A specific area designated and approved for such work, such as a maintenance shop.

b. A detached outside location which must be of noncombustible or fire resistant construction suitably separated from adjacent areas.

c. An area made fire safe by removing or protecting combustibles from ignition sources, if the work (construction, repair, etc.) cannot be moved.

EXHIBIT 5-1

PERMIT FOR CUTTING AND WELDING
WITH PORTABLE GAS OR ARC EQUIPMENT

Section A (to be completed before work is begun)

Location of work

1. Building _____
2. Floor _____
3. Location within building _____
_____

Time

This permit is valid from ____, _____ to
hour date

____, _____
hour date

NO HOT WORK IS TO BE PERFORMED UNDER THE AUTHORITY OF THIS PERMIT OUTSIDE OF THIS PERIOD

Description of Work _____
_____
_____

Special Precautions to be Taken _____
_____
_____

Is a Fire Watch Required? yes ____ no ____

The answers to the following questions must be yes or not applicable.

- Are installed sprinklers and fire alarms in service? ____
- Are fire extinguishers readily available to personnel doing the hot work? ____
- Do workers know how to turn in a fire alarm? ____
- Are all combustible and flamable materials moved at least 50 feet away from the hot work, or protected from sparks by noncombustible blankets or guards? ____
- Are walls, within 50 feet, and floors made of noncombustible materials or covered with noncombustible blankets or guards? ____
- Are wall and floor openings covered? ____
- Is the work area roped off? ____
- Are conveyors, towveyers, or other equipment which could bring combustible materials into work area either locked out or covered? ____
- Are covers suspended beneath work to collect sparks which could damage equipment below? ____
- Does the fire watcher have an extinguisher? ____

SIGNED _____
Designated Management Representative
(after inspection)

SIGNED _____
Mail Processing Tour Superintendant

SIGNED _____
Contractor's Representative

_____
_____

Section B
Final Check (to be completed after completion of work)

FINAL CHECKUP

Work area and all adjacent areas to which sparks and heat might have spread (including floors above and below and on opposite sides of walls) were inspected 30 minutes after the work was completed and were found fire safe.

SIGNED _____
Designated Management Representative
or Fire Watcher

SIGNED _____
Contractor's Representative

542 Unauthorized Hot Work Areas

Hot work may not be performed in:

a. Areas with an explosive atmosphere, such as flammable gases, vapors, liquids or ignitable dusts.

b. Areas with potentially explosive atmospheres, such as tanks, drums or other containers that had contained such flammable materials and were improperly cleaned or prepared.

c. Areas near (closer than 50 feet) large quantities of exposed, readily ignitable materials.

d. A sprinkled area when the sprinkler system is out of order.

550 PROCEDURE

551 Inspection

Prior to performing hot work, the designated management representative inspects the job site and determines if hazardous and combustible materials are present or likely to be present. Combustible materials must be protected from ignition by:

a. Moving the hot work to a location free from dangerous combustibles.

b. If the hot work cannot be moved, moving the combustibles to a safe distance, or shielding them against ignition by use of flameproof covers or guards.

c. Scheduling hot work so that no other operations that might expose combustibles to ignition are begun during performance of the work.

552 Hot Work Permit

After a satisfactory inspection, the designated management representative completes and signs Part A of the hot work permit. It must then be signed by the Mail Processing Tour Superintendent or his designee. If the hot work is being done by a contractor, the contractor's representative must also sign Part A. Part B must be signed 30 minutes after completion of hot work.

553 Assignment

When employees are assigned to perform hot work, they:

a. Must be properly trained to do the work safely.

b. Must have fire extinguishing equipment readily available at the site.

554 Fire Watcher

554.1 Need

A fire watcher must be present if any of the following conditions exist:

a. Appreciable combustible material in building construction or contents closer than 50 feet to the point of operation.

b. Appreciable combustibles are more than 50 feet away, but easily ignited by sparks.

c. Wall or floor openings within a 50-foot radius which expose combustible material in adjacent areas, including concealed spaces in walls or floor.

d. Combustible materials that are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs are likely to be ignited by conduction or radiation.

e. Other conditions which, if in the judgement of the designated management representative, require a fire watch.

554.2 Duties

The fire watcher remains in surveillance of the area for a period of 30 minutes after hot work is completed.

NOTE

When a fire watcher is not required, the designated management representative makes a final checkup thirty minutes after the completion of hot work to assure that no fire potential exists.

560 STORAGE AND USE OF OXYGEN AND ACETYLENE CYLINDERS

561 General

Oxygen and acetylene are widely used for hot work throughout the Postal Service. Acetylene is one of the most flammable substances used in industry. Oxygen, while not a fuel, supports combustion. Extreme care must be taken when handling these gases.

562 Storage

Oxygen and acetylene are usually stored in compressed gas cylinders. These cylinders must be stored in a designated and well ventilated area, at least 20 feet from combustible materials. Oxygen must be stored at least 20 feet from acetylene. All cylinders must be stored securely with valve protection covers in place. Acetylene cylinders must be stored and used with the valve end up. All inside storage areas must be dry and well protected. Cylinders must not be stored in mechanical equipment rooms or near access ways to exits.

563 Transportation

All cylinders must be transported in a secure position with valve caps in place. Acetylene cylinders must be secured with the valve end up.

564 Inspection

Prior to acceptance, all cylinders must be inspected for defects. If a cylinder fails any of the following inspection steps, it must be returned to the supplier:

a. Valve protection caps must be in place.

b. There must be no dents exceeding 10 percent of the diameter or a dent wide and deep enough for a piece of material to lodge in, without rolling off the side of the cylinder.

c. There must be no deep gouges.

d. There must be no bulges.

e. There must be no fire damage.

f. There must be no deep pitting or corrosion.

g. All cylinders must be color coded or otherwise marked as to their contents.

565 Cylinder Use

565.1 Moving

Cylinders may be moved only with a handtruck, or other suitable means. They must never be dragged.

565.2 Tools and Fittings

Only proper tools and handles may be used to install and operate valves and regulators. Pliers and crescent wrenches must not be used. Regulators may be left on cylinders provided:

a. Cylinders are located away from areas where they may be damaged.

b. Cylinders are secured in an upright position.

c. All cylinder valves are shut off, and all regulators are properly bled down.

Only fittings designed for a specific application may be used. Handmade, converted, or adapted fittings must not be used.

EXHIBIT 5-2

REFERENCES AND STANDARDS

National Fire Protection Association Codes and Standards

NFPA 51 B Standard for Fire Prevention in Use of Cutting and Welding Processes

OSHA General Industry Standards

OSHA 29 CFR 1910.252

American National Standards Institute (ANSI) Standards

ANSI Z 49 Welding and Cutting

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

USPS documents and directives are requisitioned from area supply centers on Form 7380 Supply Center Requisition.

NFPA publications are available from:
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269-9101

ANSI publications are available from:
American National Standards Institute
1430 Broadway
New York, NY 10018-3308

CHAPTER 6

FIRE ALARM SIGNAL AND DETECTION SYSTEMS

610 GENERAL

Fire alarm, signaling, and detection systems are key elements in the protection of buildings, properties, and lives. Properly designed, installed, and maintained they greatly limit the losses caused by fire and smoke. This chapter provides guidelines in the selection, installation, inspection, and maintenance of alarms, signaling, or detection systems for postal owned or postal leased buildings.

620 PURPOSE

These systems provide early detection and warning to building occupants, thus protecting lives and property. A simple system provides a reliable evacuation alarm, activated manually or automatically. The complexity of the system is influenced by the size and structural features, occupancy, hazards, age, and worth of the property. All components in a detection system must be listed by a nationally recognized testing laboratory, such as Underwriter's Laboratories. The installation of such systems must also conform with the provisions of the NFPA, the National Electrical Code, and other standards such as OSHA guidelines and those found in the Employee and Labor Relations Manual (see Exhibit 6-2).

630 TYPES OF ALARM SYSTEMS

631 Use

There are five types of fire alarm signaling systems used in postal leased or owned buildings. They include local, proprietary, central station, remote, and auxiliary systems. These alarm systems may provide one or more of the following secondary services:

a. Notifying the fire department of any emergency.

b. Activating special fire suppressing systems to extinguish or control the fire.

c. Automatically sending elevators to ground level for fire department use.

d. Overriding elevator controls to prevent stops on a fire floor.

e. Pressurizing stairwells for evacuation.

f. Operating smoke and heat vents.

g. Closing smoke or fire-rated doors and dampers.

h. Shutting down heating, ventilation, and/or air conditioning systems for smoke control.

i. Shutting down mail processing equipment.

632 Local Alarm Systems

Local alarm systems are considered the basic setup upon which other alarm systems are built. A local alarm system notifies occupants of a fire in the local premises. It is up to the occupants to notify the proper authorities.

633 Proprietary Alarm System

A proprietary alarm system is comprised of two or more separate local alarm systems tied into one central location owned or leased by the postal service. This system is often found in large postal facilities where several buildings are protected. The central alarm receiving point has monitoring equipment constantly staffed by specially trained maintenance or security personnel. These persons are trained in emergency procedures and are knowledgeable of alarm system operation and maintenance. Proprietary systems must be connected to a municipal fire department either by direct lines or through a municipal fire alarm system.

634 Central Station Alarm System

Central station systems are commercial companies contracted to monitor and receive alarms from postal owned or leased buildings. Usually these alarms are received via telephone equipment. The staffing and service provided is essentially the same as the proprietary system but is not performed by postal personnel. The central station must respond to all trouble and fire signals and either clear the trouble or notify the fire department and the Postal Service.

635 Remote and Auxiliary Alarm Systems

Local or proprietary alarms can be interconnected to a municipal fire alarm system. This system then is classed as a remote or auxiliary system. A remote system sends a signal directly from a postal facility to the fire department through postal owned equipment. A postal auxiliary system is connected to the municipal system through a master fire alarm box. The signal then is transmitted through the municipal fire alarm system.

640 TYPES OF SIGNALS

641 Alarm Signal

All postal employees should know how to respond when an alarm signal is given. This signal, sounded by a bell or a chime, indicates that a fire has been detected and that immediate action must be taken. This alarm is generally given throughout the building and is initiated by a manual or automatic device.

642 Trouble Signal

A trouble signal is an audible alarm at the control panel which tells the operator that there is something electrically wrong with the alarm system. When the trouble signal is given, maintenance personnel must be immediately notified. The trouble is given top priority until it is repaired.

643 Supervisory Signal

Supervisory signals are used to monitor the condition of particular fire equipment components. Included are such items as low water service pressure, loss of power to a fire pump, closing of a water supply valve, low water level in a supply tank, or near freezing temperatures in an outdoor water supply tank.

644 Voice Communication Systems

A voice communication system consists of a series of highly reliable speakers located throughout the postal facility connected to the fire console. When an alarm is sounded a live or pretaped message comes over the system giving specific evacuation instructions. This system may also be used during fire fighting operations for communicating with fire fighters.

645 Visual and Tactile Signals

Because postal buildings must be accessible to, and safe for, the handicapped, fire alarm systems must be equipped with visual alarm devices to protect individuals with impaired hearing. One of these devices is a combination horn/light that flashes and beeps when an alarm is sounded. There are also tactile devices on the market that indicate an alarm to the sense of touch.

650 ALARM INITIATORS

651 Pull Box

The most commonly used manual device in the Postal Service is the noncoded pull box. The pull box is a manual switch with a set of electrical contacts either open or closed, monitored by the alarm panel. When the box is manually activated, the contacts change the electrical current status, which activates an alarm signal (see figure 6-1).

NOTE

All pull boxes must be unobstructed, readily accessible, and located in the normal path of exit.

652 Detectors

Fire detectors may also initiate alarms. See 660 for a more detailed discussion of detectors.

Figure 6-1

653 Extinguishing System Alarms

Most fire extinguishing systems in the Postal Service are interconnected to act as an alarm initiating device for the building alarm system. The activation of the extinguishing system generates an alarm that gives employees an opportunity to evacuate the building.

660 DETECTION SYSTEMS

661 Products of Combustion Detectors

There are three types of products of combustion detectors: heat, smoke, and flame (see figure 6-2).

662 Heat Detectors

662.1 General

Heat is a major product of combustion. By using the principles of heat physics there are three ways to detect heat. The first principle states that heat causes the expansion of materials, the second that heat causes melting, and the third that thermoelectrical characteristics of heated metal are detectable. The detectors that use these principles to detect fire are the fixed temperature, the rate-of-rise, and the combination fixed temperature and rate-of-rise detectors.

662.2 Fixed Temperature Detectors

662.21 Use

Fixed temperature devices are found in many postal buildings because of their low cost and extreme reliability. The only drawback with this type of device is it must be replaced after a fire.

662.22 Bimetallic Thermostat

A fixed temperature detector responds when its operating element becomes heated to a predetermined level. The most commonly used in postal facilities is the bimetallic thermostat (see figure 6-3). Its sensing element is made up of two metals having different coefficients of thermal expansion arranged so that the effect when heated is a deflection in one direction. This deflection opens or closes a set of contacts that initiate an alarm signal. These detectors must be checked after a fire to ensure that they have sustained no permanent damage. These detectors are self-resetting and reusable.

662.23 Fusible Alloys

A second type of fixed temperature detector is the fusible alloy that melts when exposed to heat. The most common fusible alloy detectors are fusible links. A soft metal such as solder holds a two piece link or latch mechanism together. When the solder melts, the link separates or the latch is released, causing an alarm to be sent.

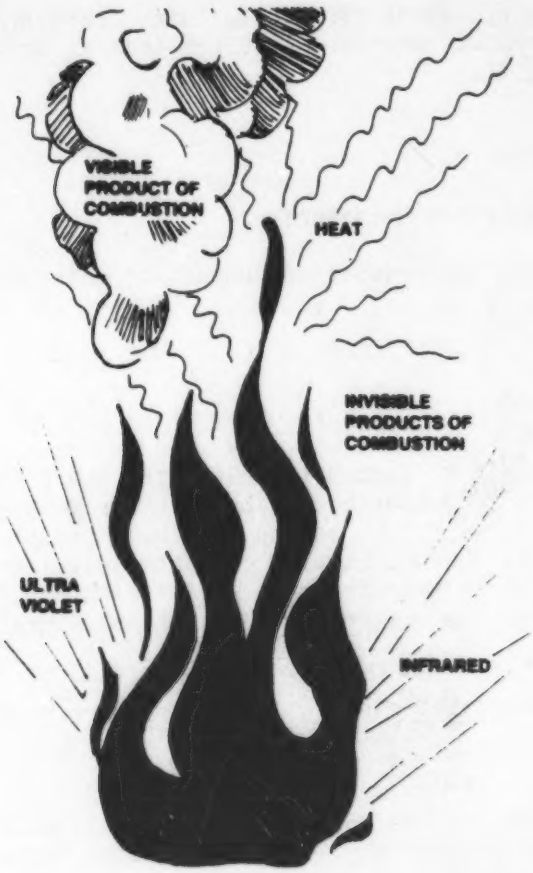

VISIBLE
PRODUCT OF
COMBUSTION
HEAT
INVISIBLE
PRODUCTS OF
COMBUSTION
ULTRA
VIOLET
INFRARED

Figure 6-2

662.24 Thermoplastic Polymers

Thermoplastic polymers provide another sort of detector. These polymers are used to insulate steel wires which are then wound around each other. When the melting point of the polymer is reached, the twisted pair of wires short together and initiate an alarm (see figure 6-4). These cables can be run throughout large areas, forming a continuous fixed temperature alarm device. After a fire, the melted section is cut out and replaced.

662.3 Rate-of-Rise Detectors

662.31 Operation

All pneumatic rate-of-rise detectors work on the principles of heat and expansion. Most rate-of-rise detectors have a small chamber filled with air, the bottom of which is made up of a flexible metal diaphragm. As the air inside the chamber expands, the diaphragm is forced to move outward. As it moves, it forces a set of electrical contacts to either open or close (see figure 6-5). This change in current initiates an alarm at the control panel. The expansion chamber also combines a small orifice that ensures a slow increase in ambient temperatures, or a drop in the barometric pressure, or both, will not cause the detector to initiate an alarm. These vents are built so that if the temperature changes rapidly, as in a fire, the rate of expansion exceeds the venting rate. Pneumatic heat detectors are available in both tube and spot type.

662.32 Thermoelectric Sensors

The only rate-of-rise detector that does not use the air chamber is the thermoelectric sensor. This sensor works on the principle that two wires of dissimilar metal twisted together, when heated at one end, will generate an electrical potential at the other end. The detector is electronically designed to bleed off or dissipate small currents. This allows it to disregard small or gradual temperature changes. When the change is great, the increase in current transmits an electrical signal to the alarm panel.

662.33 Use

Since rate-of-rise detectors are more complicated, they are slightly less dependable than the fixed temperature detectors. They also tend to be more expensive.

662.34 Combination Rate-of-Rise/Fixed Temperature Detectors

A fixed temperature detector becomes increasingly effective when combined with a rate-of-rise detector. This combination takes advantage of the capability of the rate-of-rise detector to respond to fast fires, and the dependability of the fixed temperature detector.

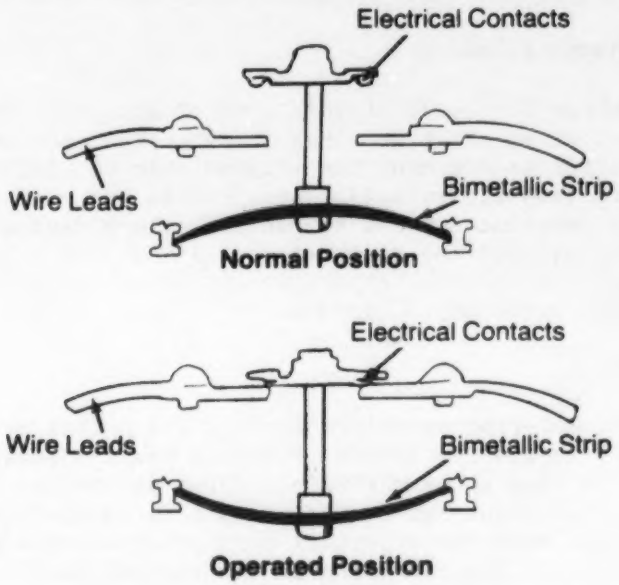
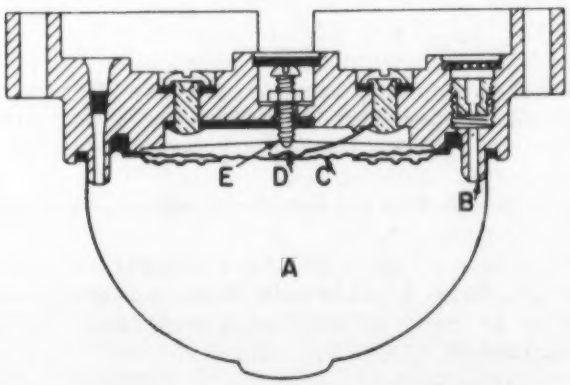


Figure 6-3

THERMOSTATIC CABLE

Figure 6-4



A. Air Chamber
B. Vent
C. Flexible Metal Diaphragm
D. Spring
E. Adjustment Screw

RATE-OF-RISE TEMPERATURE DETECTOR

Figure 6-5

663 Smoke Detectors

663.1 General

Smoke is one of the easiest products of combustion to detect. There are two types of smoke detectors, ionization and photoelectric. A smoke detector operating on the photoelectric principle responds faster to the smoke generated by low energy fires, as these fires produce larger smoke particles. Smoke detectors using the ionization principle provide a somewhat faster response to high energy fires, since these fires produce large numbers of small smoke particles.

663.2 Ionization Smoke Detectors

Ionization detectors work in the following manner. A small amount of radioactive material is placed in a sensing chamber. The material ionizes the air in the chamber, thus making it conductive. A current flows through the air between two charged electrodes. When smoke particles enter the ionized area, they decrease the conductance of the air. When the conductance is less than a predetermined level, the detector will respond (see figure 6-6).

663.3 Photoelectric Smoke Detectors

663.31 General

Photoelectric detectors have been used for several years, particularly if the type of fire anticipated is expected to generate a substantial amount of smoke before temperature changes are sufficient to actuate a heat detector. This detector operates on a principle that smoke entering a light beam either obscures the beam's path or reflects light into a photocell.

663.32 Light Obscuration Detectors

Most light obscuration detectors are beams used to protect large open areas. They are installed with the light source at one end of the area and the receiver at the other end. When smoke particles enter the light beam, the light reaching the photosensitive device is reduced initiating an alarm. When this beam application is used a delay is generally programed into the alarm switch. This delay allows an animal or the top of a piece of moving equipment to move through the beam without sending an alarm. The atmosphere in the area must be kept relatively clean to avoid false alarms.

663.32 Light Scattering Detectors

The operating principles of light scattering detectors are opposite of the light obscuration detector. A light beam passes through a small chamber toward the end away from the light source. The light does not normally strike the photocell. When smoke is drawn through the chamber, it causes the light beam to be reflected in random directions. A portion of the scattered light strikes the photocell, initiating a current which in turn activates an alarm. This type of detector must be carefully placed to ensure correct availability of air. When installed correctly, it is a reasonably reliable, sensitive detector.

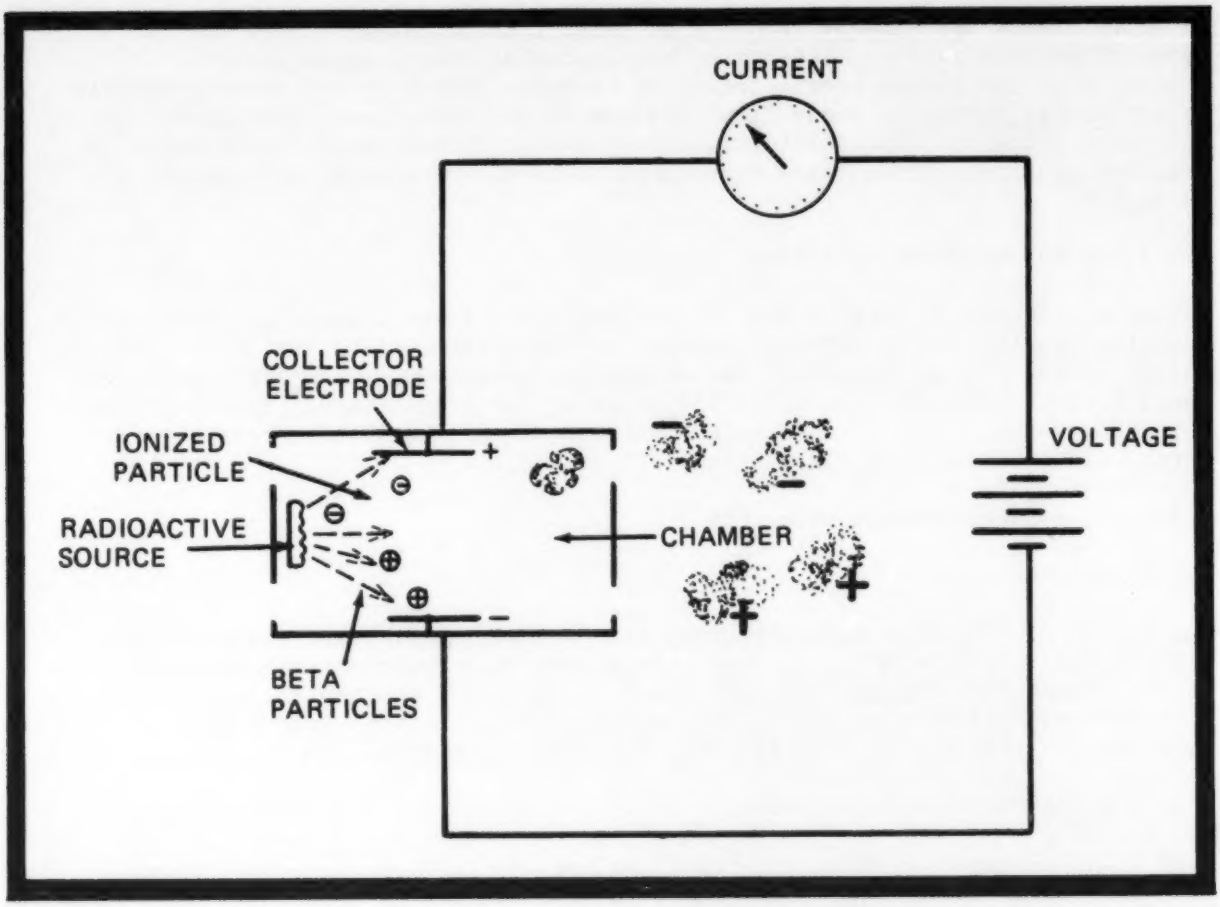

CURRENT
COLLECTOR ELECTRODE
IONIZED PARTICLE
RADIOACTIVE SOURCE
CHAMBER
VOLTAGE
BETA PARTICLES

Figure 6-6

NOTE

Smoke detectors must not be installed in areas where normal ambient temperature is likely to exceed 100°F or fall below 32°F (0°C), unless they have been specifically listed for installation at higher or lower temperatures.

664 Flame Detectors

664.1 General

Flame detectors detect the appearance of radiant energy visible or invisible to the human eye. Though they offer an extremely fast response, they may have a high false alarm rate due to the accidental placement of an infrared or ultraviolet source in their line of sight. Care must be taken to ensure that they can see the entire protected area. Although fairly expensive, they are well suited to protecting areas where explosive or flammable vapors or dusts are encountered.

664.2 Infrared Flame Detectors

Infrared detectors have a sensing element responsive to radiant energy outside of human vision. This detector can respond to either the total infrared component of the flame alone, or in combination with flame flicker in the frequency range of 5 to 30 hertz. To minimize false alarms infrared detectors must be mounted away from any sunlight and heat producing appliances.

664.3 Ultraviolet Flame Detector

Ultraviolet detectors have a somewhat wider application than the infrared, since they are essentially insensitive to both sunlight and artificial light. This detector uses either a solid-state device or a gas-filled tube for a sensing element.

665 Installation of Detectors

The location and spacing of detectors is based upon the principle of operation and an engineering survey of the conditions anticipated in service. Ceiling shape and surfaces, ceiling height, configuration of contents, burning characteristics of combustible material present, and ventilation are some of the conditions that must be considered. Refer to manufacturer's technical bulletins and applicable NFPA standards on detector uses and locations (see Exhibit 6-2).

670 MAINTENANCE AND TESTING

671 General

The maintenance and testing of all postal owned fire alarm and detection systems must be done by properly trained maintenance personnel. In addition, copies of the technical and parts manuals must be obtained from the manufacturer to assist in performing routine maintenance or repair. If competent technicians are not available to work on these systems, a service contract with an alarm company must be obtained (see Exhibit 6-1 for a Chart of Inspection and Testing Frequencies).

EXHIBIT 6-1

FIRE ALARM DETECTION AND SIGNALING SYSTEMS INSPECTION AND TESTING FREQUENCY

	DAILY	WEEKLY	BI MONTHLY	QUARTERLY	SEMI ANNUALLY	ANNUAL
NONSUPERVISED FIRE ALARM SYSTEMS			X			
SUPERVISED FIRE ALARM SYSTEMS						X
FIRE ALARM SYSTEM CONTROL BOARDS	X					
FIRE ALARM RECORDS		X				
MANUAL PULL STATIONS				X		
SUPERVISORY SIGNALS				X		
BATTERY CHARGERS				X		
BATTERIES				X		
AUTOMATIC FIRE DETECTION OR ALARM DEVICE					X	
FIXED DETECTORS						5 YEARS AFTER 1ST - 15 YEARS (2% OF)

672 Equipment Inspection

672.1 Alarms and Detectors

A visual inspection of equipment must be performed on a regular basis. Bells, gongs, buzzers, pull boxes, detectors, etc., must be free of paint, dirt, or any damage which may interfere with their operation. Exposed circuit wiring must be checked for wear, punctures, cracks, and other defects which could render the insulation ineffective. Conduit must be inspected for proper support and solid connections.

672.2 Control Boxes

All control boxes must be clean, properly identified, and have no obstructions or foreign objects in or around them.

672.3 Battery Systems

Battery systems used as emergency power sources must be kept clean and fully operational. Battery levels must be checked and maintained at least once every quarter.

672.4 Manual Pull Stations

On new installations, pull boxes must be checked to ensure they are located near exits and all natural paths of escape. Additional boxes must also be provided so that the travel distance to the nearest box does not exceed 200 feet. All pull stations must be unobstructed, and each unit must be easy to operate. Any damage or cracked glass must be immediately replaced and the unit must be checked for proper operation. The manual pull station system must be tested at least quarterly. A different pull box must be used for each test.

673 Detector Testing

673.1 General

An alarm is only as reliable as the detectors it uses, so detectors require periodic testing. Three conditions require testing: the initial installation, after a fire, and after an elapsed period of time. All fire detector testing must be in accordance with applicable NFPA Standards (see Exhibit 6-2).

673.2 Fixed Temperature Detectors

Testing of nonrestorable fixed temperature detectors is not required until 15 years after installation. After the fifteenth year, and every 5 years thereafter, at least two detectors out of every hundred, or fraction thereof, must be removed and sent to a nationally recognized testing laboratory for tests. The detectors that have been removed must be replaced with new detectors. Failure of any detector requires additional detectors to be submitted for testing. Cable type line detectors must have their loop resistance tested semiannually.

673.3 Spot Type Heat Detector

Restorable spot type heat detectors are tested on a regular basis. At least one detector on each signal initiating circuit must be tested semiannually, and a different detector must be selected for each test. They may be tested with a portable heat source such as a hair dryer or heat lamp with a temperature shield.

673.4 Pneumatic Detector

Pneumatic line type detectors must be tested for leaks and proper operation semiannually. These detectors may be tested with a heating device or with an approved pressure pump. If a pressure pump is used, the manufacturer's instructions must be followed.

673.5 Smoke Detectors

Smoke detectors must be tested semiannually in accordance with manufacturer's instruction. Instruments to perform tests and set sensitivities are generally available from the manufacturer.

NOTE

Blowing smoke near a detector is not considered a proper test.

673.6 Flame Detectors

Flame detectors must be tested at least semiannually as prescribed by the manufacturer and more often if found to be necessary for the application in question. Due to the intricacy and expense of this equipment, it is recommended that training, or a service contract, be obtained from the manufacturer.

673.7 Records

A permanent record of all detector tests must be kept on the premises for at least 5 years. The minimum information required on these records are the date, detector type and location, type of test, name of inspector, and the results.

674 Control Equipment Inspection

674.1 General

Control equipment consists of local annunciator panels and signal switching or transmitting devices. When testing, verify that the proper zones are indicated on all annunciator panels and that the time stamp is clearly recording the time and location of the signals.

674.2 Alarms and Power Sources

All alarms associated with these panels must be inspected to see that they are clean and operable. The supervisory power source must be checked for proper

operation by viewing the pilot light or gauge. If an emergency power supply is installed, it is tested by interrupting the 120 volt AC power supply to ensure the unit will convert to battery.

NOTE

During all testing, the municipal signal must be disabled and the fire department notified. After all tests are completed, the devices must be returned to their normal standby condition.

680 RESPONSIBILITY

In all buildings owned by the Postal Service, the USPS is responsible for periodic inspections and routine preventive maintenance of fire alarm detection and signaling systems. In buildings operated by the General Services Administration, GSA is responsible for repair and or replacement of alarm systems and components. In leased buildings, the lessor is responsible for repairs to the alarm system and replacement of components unless otherwise indicated in the terms of the lease. In total maintenance leased buildings, the Postal Service is responsible for repairs and replacement as well as preventive maintenance. There must be no delays in the repair of alarm systems. All repairs must be termed EMERGENCY and receive priority attention. If a fire alarm system has to be taken out of service, all key personnel must be informed. Form 4707, Out of Order Tag, must be displayed whenever any station is inoperative.

EXHIBIT 6-2

REFERENCES AND STANDARDS

National Fire Protection Association Codes and Standards

NFPA 71 Central Station Signaling Systems

NFPA 72A Local Protective Signaling Systems

NFPA 72B Auxiliary Protective Signaling Systems

NFPA 72C Remote Station Protective Signaling Systems

NFPA 72D Proprietary Protective Signaling Systems

NFPA 72E Automatic Fire Detectors

Fire Protection Handbook (Fifteenth Edition):

SECTION 15 Fire Alarm Systems, Detection Devices, and Guard Services

CHAPTER 2 Protective Signaling Systems

CHAPTER 4 Automatic Fire Detectors

OSHA General Industry Standards

1910.165 Fire Detection Systems

1910.164 Employee Alarm Systems

US Postal Service Documents

Employee and Labor Relations Manual para. 853

HBK MS-1, Operation and Maintenance of Real Property: Section, Electrical Systems Fire Alarm Systems Storage Batteries

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

USPS documents and directives are requisitioned from area supply centers on Form 7380 Supply Center Requisition.

NFPA publications are available from:
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269-9101

CHAPTER 7

STANDPIPE AND HOSE SYSTEMS

710 GENERAL

711 Scope

This chapter covers the minimum requirements for the maintenance and inspection of standpipe and hose systems when installed in postal owned or postal leased buildings.

712 Hardware

Standpipe systems may be supplied by either a direct connection to a water supply, a fire department pumper, or both. These connections and outlets may be in either a vertical or horizontal position and are usually located on each floor, on roofs, in basements, or outside in open yard areas of larger facilities.

713 Water Supply

A standpipe system must be supplied with adequate water and pressure in order to be effective. Properly installed systems provide a quick and convenient means for operating hose streams. A standpipe system is an arrangement of piping, valves, hose connections, hose outlets, and allied equipment.

714 Effectiveness

Standpipe systems which are properly designed, equipped, and maintained are an effective means for extinguishing fires. Even in buildings equipped with automatic sprinkler systems, standpipes may be a necessary complement. The standpipe system furnishes a reliable means of obtaining effective hose streams in the shortest possible time in difficult to reach areas.

715 Classification

Standpipe systems are classified according to their intended use. There are three classes of standpipe systems:

a. Class I systems are designed for use by fire departments only. Class I service must furnish the effective hose streams required during the more advanced stages of a fire. These systems employ the large 2 1/2 inch hoses. Postal employees are not authorized to use this system.

b. Class II systems are designed for use by building occupants who are not trained in advanced interior structural firefighting operations. These systems use 1 1/2 inch outlets and hoses. If the building is equipped with a Class II system, postal employees assigned to the fire brigade are to be trained in the use of this system.

c. Class III systems are designed for use by both fire departments (those trained in the use of heavy hose streams) and the building occupants. A Class III system is capable of furnishing adequate water volume and pressure to meet the requirements of Class I and Class II service. It is not recommended that postal employees use this system.

720 TYPES OF SYSTEMS

There are four types of standpipe systems currently in use at many postal installations:

a. Wet standpipe systems which have the water supply open and maintain water pressure at all times.

b. Dry standpipe systems which admit water to the system through the operation of a manually activated control valve.

c. Dry standpipe systems which admit water to the system automatically through the use of approved devices such as dry pipe valves.

d. Dry standpipe systems which have no permanent water supply and must be supplied with water by the fire department.

730 WATER SUPPLY FOR STANDPIPE SYSTEMS

To fight a fire, the amount of water required for standpipe systems depends upon the size and number of fire hose stations that will be needed and the probable length of time they will be used. Both of these factors are largely influenced by the construction and occupancy of the building.

740 SYSTEM REQUIREMENTS

741 General

Closets and cabinets used to contain fire hoses must be of sufficient size to permit the installation of the necessary equipment at hose stations, and designed so as not to interfere with the prompt use of the hose valves, the hose, and other equipment in the event of an emergency. Within the cabinet, the hose valves must be located so that there is at least 1 inch between any part of the cabinet and the handle of the valve when the valve is in any position from fully open to fully closed. The cabinet must be used for fire equipment only and each cabinet must be conspicuously identified.

742 Number and Location of Standpipes

742.1 Local Requirements

The number and arrangement of standpipe equipment necessary for proper protection is governed by local conditions such as occupancy, character and construction of the building, exterior exposures, and accessibility.

742.2 Hose Station Distribution

When Class I, Class II, and Class III service is installed, the number of hose stations in each facility and in each section of a building divided by firewalls must be such that all portions of each story of the building are within 30 feet of a nozzle attached to not more than 100 feet of approved hose. In buildings divided by numerous partitions, standpipes must be located so that hose streams can be brought to bear in any room.

743 Location of Standpipe

Standpipe risers and horizontal standpipe runs must not pass through hazardous areas and must be located so they are protected from mechanical and fire damage. Dry standpipes must not be concealed in building walls or built into pilasters.

750 HOSE CONNECTION REQUIREMENTS

751 Location

Hose connections must be within easy reach of a person standing on the floor and may in no case be over 6 feet from the floor. Hose connections must be conspicuously located within the immediate area and not obstructed.

752 Threads

Hose connection threads should conform to the American National Fire Hose Connection Screw Threads, as specified in applicable NFPA standards (see Exhibit 7-1). Check to ensure local threads are compatible with fire department equipment.

753 Hose, Hose Racks, and Nozzles

753.1 Requirements

Each hose connection provided for use by building occupants (Class II and Class III services) must be equipped with not more than 100 feet of approved, listed 1-1/2 inch lined hose, with nozzle, attached and ready for use. Each station provided with 1-1/2 inch hose must be equipped with an approved, listed rack assembly or other approved storage facility. Each rack or storage facility for 1-1/2 inch hose must be provided with a label affixed to the cabinet door stating "Fire Hose for Use by Occupants," and operating instructions. Nozzles for Class II service hose must be listed and approved with a variable hose stream and shutoff capability.

753.2 Hose Connections for Dry Standpipes

Each hose connection for dry standpipes must be provided with a conspicuous, durable, and permanently legible sign reading "Dry Standpipe for Fire Department Use Only."

760 TESTS, INSPECTIONS, AND MAINTENANCE

761 Tests

761.1 Regular Tests

Piping between the fire department connection and the check valve in the inlet pipe must be tested hydrostatically in the same manner as the balance of the system, at intervals of not less than 5 years.

761.2 Dry Pipe Testing

In a standpipe system, any piping which normally remains dry must be tested hydrostatically at 50 pounds per square inch above the normal pressure, at intervals of not less than 5 years.

762 Inspection

762.1 General

Systematic periodic inspections of all portions of the standpipe system are essential. Inspection procedures for standpipe systems, frequency, and reports are found in HBK MS-1, Operation and Maintenance of Real Property (Appendices 13-A and B).

762.2 Inspection Procedures

Regular inspection and testing of standpipe systems is necessary to ensure proper operation. Standpipe inspections must include all valves and piping leading from the water supply to the hose stations. When conducting periodic inspections, check the following:

a. Wet standpipes must be inspected semiannually.

b. Hose closets and cabinets are used for fire equipment only.

c. Water supply control valves are chained or otherwise sealed in the open position.

d. Discharge outlets are checked for proper operation, gasket condition, presence of corrosion, stoppage, and leaks. If the valves in the wet system are operated during the inspection, before initiating tests, the main water supply valve must be closed and the system drained.

e. Tanks are 2/3 full of water and if pressurized, at least 75 psi is maintained. Precautions against freezing are to be taken when necessary.

f. Dry standpipe systems are inspected annually to ensure operational readiness.

g. Discharge outlets in a dry system are checked to see they are closed.

h. The hose is inspected for general condition, dryness, and proper position on the swingout rack or holder. It must be removed and reracked at least annually. The swingout rack must operate easily.

i. The threads on all nozzles and couplings are not damaged, or out of round. Ensure all rubber gaskets are in good condition.

j. The fire department connections are accessible, between 18 and 36 inches from the ground, caps are in place, threads are not damaged, the check valve operates, and no debris has been placed in the connection that would obstruct the flow of water.

k. Each hose cabinet or closet is provided with a conspicuous sign which reads "Fire Hose" and/or "Fire Hose for Use by Occupants."

l. Fire department connections have the proper fire department thread and are posted with a sign reading "Standpipe."

m. Dry standpipes are posted with a sign reading "Dry Standpipe For Fire Department Use Only."

763 Maintenance

Ensure that water supply tanks are kept at the proper level. When pressure tanks are used, ensure that specified pressure for the system is maintained at all times:

a. Valves in the main piping connections to the automatic sources of water supply must be kept fully open at all times.

b. At least once a year, and after each use, hose systems must be inspected to ensure that all equipment and hoses are in place, available for use, and in a serviceable condition.

c. When the system or any portion thereof is found to be unserviceable, it must be removed from service immediately and replaced with equivalent protection, such as extinguishers or fire watches.

d. At least once a year, all existing hose must be unracked, physically inspected for deterioration and reracked using a different fold pattern. All defective or otherwise unserviceable hose must be replaced with approved, lined hose.

EXHIBIT 7-1

REFERENCES AND STANDARDS

National Fire Protection Association Codes and Standards

NFPA-13, Standard for the Installation of Sprinkler Systems

NFPA-13E, Recommendations for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems

NFPA-14, Standpipe and Hose Systems

NFPA-20, Standard for the Installation of Centrifugal Fire Pumps

NFPA-22, Standard for Water Tanks for Private Fire Protection

NFPA-24, Standard for Outside Protection

NFPA-1961, Standard for Fire Hose

NFPA-1962, Standard for the Care, Use and Maintenance of Fire Hose Including Connections and Nozzles

NFPA-1963, Standard for Screw Threads and Gaskets for Fire Hose Connections

OSHA General Industry Standards

29 CFR 1910. 158, Standpipe and Hose Systems

US Postal Service Documents

HBK MS-1, Operation and Maintenance of Real Property

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

USPS documents and directives are requisitioned from area supply centers on Form 7380 Supply Center Requisition.

NFPA publications are available from:
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269-9101

CHAPTER 8

SPRINKLER SYSTEMS

810 GENERAL

811 Scope

This chapter cites applicable portions of the OSHA standards, and NFPA and USPS regulations regarding the operation and maintenance of various types of sprinkler systems when installed in postal owned or leased buildings.

812 Purpose

This chapter provides the installation head and maintenance and safety personnel with the necessary information to maintain, repair, inspect, and test both wet and dry type sprinkler systems. Additional information is included to inform maintenance personnel of extra sources and guides to be used in maintenance procedures.

820 DEFINITION

A sprinkler system is a series of pipes, valves, and various mechanical equipment distributed in a given location that conveys water to outlets for fire extinguishment. Sprinkler systems, which are normally automatic, afford protection to property, equipment, and personnel by extinguishing fire promptly, and continuously discharging water directly on the burning materials.

830 BASIC REQUIREMENTS

831 Fire Department Connections

Each sprinkler system must have a minimum of one (1) connection which allows the fire department to pump water directly into the system. These connections must be identified by a sign having raised letters at least one inch (1") cast on a plate or fitting showing the type of sprinkler (i.e. AUTO SPKR or OPEN SPKR).

832 Vertical Clearance

Sprinklers must have a minimum vertical clearance of eighteen (18") inches above material below them; so as to properly protect/sprinkle the assigned area.

833 Water Supply

Every automatic system must be provided with an automatic water supply capable of providing design flow for at least 30 minutes.

834 Flow Alarms

Water flow alarms must be provided on all systems consisting of more than 20 sprinklers.

840 TYPES OF SPRINKLERS

841 Wet Pipe Systems

841.1 Location

Wet pipe systems are only installed where they cannot freeze and where water will not create additional hazards.

841.2 Use

Systems are charged with pressurized water at all times. Systems operate automatically when the fusible element is released due to a heat build-up. Hose connections may be attached to wet pipe sprinkler systems, if the water supply satisfies both designed demands.

842 Dry Pipe Systems

842.1 Location

Dry pipe systems are normally installed in areas where the system or portions of the system may freeze.

842.2 Use

These systems are normally charged with compressed air that is released when one or more of the fusible heads are subjected to heat buildup in a given location. The system must be installed so that it may be totally drained without the formation of water pockets that could freeze and cause damage to the system or prevent portions from operating as designed.

843 Deluge and Preaction Systems

843.1 Location

Deluge and preaction systems are used for fast total application, and are usually found in hazardous areas, such as conveyor openings in the floor. Preaction systems are designed to protect properties where there is danger of serious water damage as a result of damaged automatic sprinklers or broken pipes.

843.2 Use

In deluge systems, the entire fire area is sprinkled by admitting water to sprinklers that are open at all times. Deluge systems are actuated by using sensitive thermostatic controls operating on the rate-of-rise or fixed temperature principle or controls designed for individual hazards.

Preaction systems differ from standard dry pipe systems in that the preaction system water supply valve is actuated independently of the opening of sprinklers and is opened by the operation of the automatic fire detection system, not by the fusing of a sprinkler head.

850 ASSOCIATED EQUIPMENT

851 Valves

A typical sprinkler system may include: test valves, control valves (i.e. OS & Y, backflow), check valves, dry pipe valves, and deluge or preaction valves. They are used for flow control, and flow monitoring and usually are supervised to cause the activation of an alarm and/or a supervisory signal in case of water flow or tampering.

852 Alarm Systems

Water motor alarms are required on all systems and are actuated by the flow of water.

853 Sprinkler Heads

Sprinkler heads are used in a given location based on the temperature requirements, the type of system, and on the spray pattern required. When sprinkler heads are replaced, caution must be used so that they are replaced with a head of the same color code or temperature rating (see figure 8-1).

854 Pumper Connections

On connections installed for fire department pumper connections, caution must be exercised to be sure threads used on connections are compatible with the local fire department. If threads are not compatible, an adapter may be required. Required mounting height is between 18 and 36 inches from floor.

855 Fire Pumps

Fire pumps supplement the water supply available from public mains, gravity tanks, reservoirs, or other sources. Generally, the centrifugal fire pump is considered standard mainly because of its compactness, reliability, ease of maintenance, hydraulic characteristics, and variety of available drives. Drives for fire pumps may be an electric motor, internal combustion engine, or steam turbine type. Fire pumps must be housed to prevent freezing, dirt accumulation, corrosion, and tampering.

856 Retarding Chamber

Wet pipe systems that are subject to fluctuating water supply pressures need an alarm retarding device in order to prevent false alarms. Retarding chambers are inserted in the water line from the alarm check valve to the water motor gong and the electric circuit.

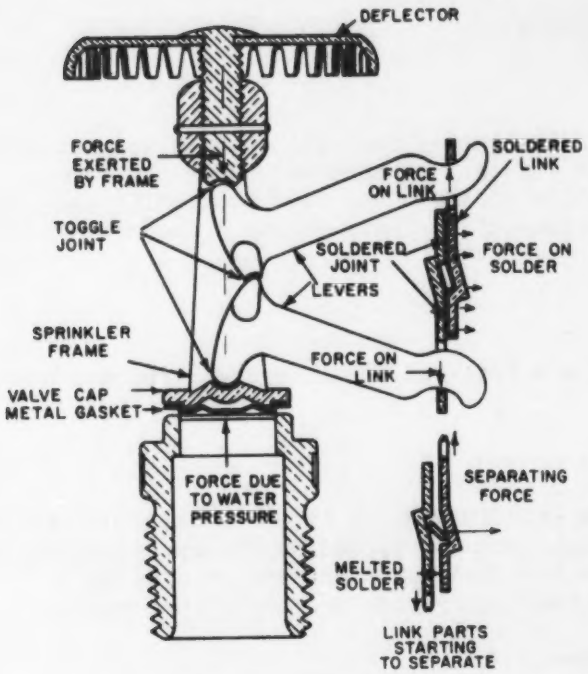

DEFLECTOR
FORCE EXERTED BY FRAME
SOLDERED LINK
FORCE ON LINK
TOGGLE JOINT
SOLDERED JOINT
FORCE ON SOLDER
LEVERS
SPRINKLER FRAME
FORCE ON LINK
VALVE CAP METAL GASKET
FORCE DUE TO WATER PRESSURE
SEPARATING FORCE
MELTED SOLDER
LINK PARTS STARTING TO SEPARATE

Figure 8-1

857 Exhauster or Accelerator

Dry pipe systems with a capacity of more than 500 gallons must have quick opening devices such as exhausters or accelerators. These devices operate as a result of a quick, but not large, drop in system air pressure. Both devices employ 2 chambers, one open to the dry pipe system and the other closed except for a small orifice which allows its internal pressure to equalize with the normal dry pipe air pressure. The two chambers are separated by a diaphragm which, under given pressure, moves and actuates valves and mechanisms that open the dry pipe valve.

860 TESTING

861 Inspector Test Valves

Inspector test valves which provide for flow equivalent to that from one sprinkler, must be opened at least annually to ensure proper operation of the sprinkler system.

862 Flow Test

A water supply test pipe and pressure gauge must be provided to determine whether water supplies and connections are in order. A 2-inch drain at the sprinkler riser may suffice as a water test valve.

863 Acceptance Test

Acceptance tests for new system installations must include all of the following:

a. Flushing of system and underground connections.

b. Hydrostatic tests of piping.

c. Air tests of dry pipe systems.

d. Dry pipe valve operation.

e. Drainage tests.

f. Certification of tests and materials by qualified contractor.

864 Repairs

Faulty items identified during testing or inspections must be repaired immediately. All sprinkler system repairs must be termed EMERGENCY and receive priority attention. When required to secure a system or a portion of a system for maintenance or repair, notification must be given to the proper authorities, including installation head, maintenance manager, fire department, maintenance control office or such other offices as may be required by the installation head. Standby or alternate protection such as fire watch, additional fire extinguishers, etc. must be provided.

870 MAINTENANCE

871 Responsibility

871.1 Postal Owned Buildings

The U.S. Postal Service is responsible for periodic inspections, routine preventive maintenance, and repairs on the sprinkler systems in all buildings it owns.

871.2 GSA Owned Buildings

In all buildings owned by the General Services Administration, GSA is responsible for all preventive maintenance, testing, replacement, and repair of sprinkler systems and components.

871.3 Lessor Maintained Leased Buildings

In leased buildings, the lessor is responsible for repairs to sprinkler systems and components unless otherwise indicated in the terms of the lease.

871.4 USPS Maintained Leased Buildings

In total maintenance leased buildings, the Postal Service is responsible for repairs and replacement of system components as well as testing and preventive maintenance.

872 Inspection

872.1 Valves

All valves must be checked annually to verify that they are in good operating condition, turn easily, and do not leak. Valves must be unobstructed at all times and identified as to location, use, and portions of system controlled.

872.2 Alarms

System alarms must be tested every quarter (see Chapter 6).

872.3 Sprinklers

Basic sprinkler maintenance must include an annual check of heads to verify that sprinklers have not accumulated an excessive amount of foreign material (such as dust, paint, or even plastic bags that have been placed on them for protection while painting). Materials must not be stacked closer than 18 inches to a sprinkler head.

872.4 Maintenance Checklists and Guidelines

Checklists and guidelines to perform routine maintenance are available from the following sources:

a. HBK MS-1, Operation and Maintenance of Real Property, (Appendix 13-B)

b. OSHA Safety and Health Standards (29 CFR 1910).

c. National Fire Protection Association 13 and 13A.

d. Manufacturer's maintenance and repair manuals.

NOTE

See Exhibit 8-1 for a further list of applicable references.

873 Training

873.1 Inspector Training

Systems must be inspected annually by a person knowledgeable in the design and trained in the function of the system to ensure the system is properly maintained.

873.2 Employee Training

The employees designated to inspect, maintain, operate, or repair sprinkler systems must be properly trained in all system functions.

873.3 Training Records

Employee training records must be reviewed periodically and training updated as necessary in all functions employees are required to perform.

EXHIBIT 8-1

REFERENCES AND STANDARDS

National Fire Protection Association Codes and Standards

NFPA-13 Standard for the Installation of Sprinkler Systems

NFPA-13A Recommended Practice for the Care and Maintenance of Sprinkler Systems

NFPA-14 Standard for the Installation of Standpipe and Hose Systems

NFPA-15 Standard for the Installation of Centrifugal Fire Pumps

NFPA-101 Life Safety Code, Section 7-7

NFPA Fire Protection Handbook

OSHA General Industry Standards

1910.159 Automatic Sprinkler Systems

1910.160 Fixed Extinguishing Systems

US Postal Service Documents

Employee and Labor Relations Manual para. 850

Form 1784, Safety and Health Inspection Checklist

Management Instruction AS 510-83-3 Building and Site Design Safety Requirements

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

USPS documents and directives are requisitioned from area supply centers on Form 7380 Supply Center Requisition.

NFPA publications are available from:
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269-9101

CHAPTER 9

SPECIAL PURPOSE FIXED EXTINGUISHING SYSTEMS

910 GENERAL

911 Scope

This chapter covers applicable OSHA, NFPA, and USPS requirements for the inspection, testing, maintenance, and repair of special purpose fixed extinguishing systems installed in postal owned or leased buildings (see Exhibit 9-1 for a list of these references).

912 Purpose

This chapter provides the basic maintenance standards, special requirements, and uses of special purpose fixed extinguishment systems.

913 Definition

Special purpose fixed extinguishing systems are systems designed to provide fire protection to specific operations, such as computer rooms and electrical and electronic equipment.

920 SYSTEM REQUIREMENTS

921 Alarms

Distinctive alarms or signaling systems that are able to be perceived above ambient light or noise levels must be installed on all fixed extinguishing systems. If the system discharge is not immediately recognizable, alarms or signals must alert employees. Tactile devices may be required to alert those employees who would not recognize a visual or audible alarm. Total flooding systems must be provided with employee predischarge alarms.

922 Signs

Hazard or caution signs must be posted inside of, and at the entrance to, areas where fixed extinguishing systems are installed.

923 Abort Switches

Manual pull stations and abort switches must be provided on each fixed system.

924 Records

Agent container inspection and maintenance dates must be recorded on the container, on an attached tag, or in a central location. The original weight and pressure of agent containers must be checked semiannually. Manufacturer's specifications must be available in maintenance files.

925 Rescue

Where a total flooding system may entrap personnel, a prompt means of rescue must be provided. Special training and warning signs must be considered.

930 TYPES OF SYSTEMS

931 Carbon Dioxide (CO_2) Systems

931.1 Description

CO_2 is a colorless, odorless, electrically nonconductive inert gas that extinguishes fires by reducing the concentrations of oxygen until combustion stops.

931.2 Ineffective Use

CO_2 does not extinguish fires in chemicals with their own oxygen supply, or reactive metals such as sodium or magnesium.

931.3 Uses

CO_2 systems are used to extinguish fires in specific hazards or equipment, and in areas where an inert electrically nonconductive medium is essential. CO_2 is effective on:

a. Gaseous or flammable liquids.

b. Electrical hazards such as transformers, oil switches, circuit breakers, etc.

c. Engines using gasoline or other flammable fuels.

d. Ordinary combustibles, such as paper, wood, and textiles.

931.4 CO_2 System Safety

a. CO_2 dilutes oxygen in the air. This can create hazardous atmospheres. Large volume discharge of CO_2 seriously interferes with visibility during and immediately after discharge.

b. When using a CO_2 system, if personnel may be trapped in or enter hazardous atmospheres, suitable safeguards must be provided for prompt evacuation of, and to prevent entry into, such areas. Safeguards may be such things as predischarge alarms or flashing lights.

c. CO_2 systems with a design concentration of 4 percent or greater must have a predischarge alarm for alerting employees.

932 Halon 1301 Systems

932.1 Description

Halon 1301 is a colorless, odorless, electrically nonconductive fire extinguishing gas.

932.2 System Safety

Halon systems must not be used in concentrations less than 5 percent nor greater than 7 percent in areas where people work. Exposure to Halon 1301 vapors in low concentrations for brief periods may be accomplished without serious risk.

NOTE

Halons are not to be used on certain chemical mixtures such as gun powder or on reactive metals such as sodium, potassium, or magnesium.

932.3 Uses

Halon systems are useful for extinguishing fires in specific hazards or equipment, where electric nonconductivity is essential, where cleanup presents a problem, or where weight vs. extinguishing potential is a factor. In the Postal Service, halon systems are found in Bulk Mail Centers (BMCs), Transportation Management Offices (TMOs), Postal Source Data Systems (PSDSs), Electronic and Computer-Originated Mail (ECOM) sites, and other computer equipment areas. Halon is effective on the following:

a. Gaseous or flammable liquid materials.

b. Electrical hazards such as transformers, circuit breakers, and electronic equipment.

c. Engines using gasoline or flammable fuels.

d. Ordinary combustibles such as paper and wood.

e. Hazardous solids.

940 SYSTEM OPERATION

941 Automatic Operation

941.1 Pneumatic Operation

Pneumatic operation occurs when the rate of temperature rise in the hazard area becomes excessive to the point where the pneumatic control head vent cannot bleed off the pressure fast enough and the control head operates.

941.2 Electric Operation

Electric operation occurs when the temperature or ionization conditions in the hazard area rise to the point where the electrical fire detector operates, activating the control head or solenoid valve located on the extinguisher assembly discharge control valve assembly.

942 Manual Operation

942.1 Local Operation

Local operation is performed by activating the system at the extinguisher supply assembly. Operating instructions must be posted at this location.

942.2 Remote Control

Remote operation is performed by pulling the handle of the remote control box marked for a given hazard area.

950 TRAINING

All persons expected to inspect, test, maintain, and operate fire extinguishing systems must be thoroughly trained and competent in the functions they are expected to perform.

960 TESTING

961 Requirements

Systems and their components must be thoroughly inspected and tested in a manner as set forth in HBK MS-1, Operation and Maintenance of Real Property.

962 High Pressure Cylinders

High pressure cylinders used in fire extinguishing systems must not be recharged without a hydrostatic test if more than five (5) years have elapsed from the date of the last test. Cylinders continuously in service without having discharged may be retained in CO_2 service for a maximum of twelve (12) years before testing and recharging, and in Halon 1301 service for a maximum of twenty (20) years before testing and recharging. The pressure container must be made, tested, approved, equipped, and marked in accordance with the current specifications of the American Society of Mechanical Engineers (ASME) Code for Unfired Pressure Vessels. For compressed gas cylinders passing a hydrostatic test, the month and year is stamped into the cylinder only on the shoulder, top head, neck, or footing.

970 MAINTENANCE

971 Operating Condition

Systems must be maintained in full operating condition at all times. Any repair of a system must be a priority item classified EMERGENCY.

972 Service Requirements

Damaged or inoperative components must be replaced at once by competent service personnel. It is recommended that system maintenance be performed by a contractor qualified and approved by the system manufacturer.

973 Monthly Inspection

A monthly general inspection of the system must be made to ensure damage to equipment and piping has not occurred, and that access to the extinguisher assembly and control boxes is maintained.

974 Pressure Checks

All agent supply cylinder pressure gauges must be checked monthly for proper operating pressure.

975 Cylinder Weight

Extinguisher assemblies must be checked for proper weight semiannually. If there is a loss of weight in excess of 5 percent or a loss of pressure of more than 10 percent, the cylinder must be repaired and/or recharged.

976 Designation

All components must be checked to verify that they are properly designated, and are provided with proper operating instructions.

EXHIBIT 9-1

REFERENCES AND STANDARDS

National Fire Protection Association Codes and Standards

NFPA 12, Standard for Carbon Dioxide Extinguishing Systems

NFPA 12A, Standard for Halon 1301 Fire Extinguishing Systems

NFPA 75, Standard for Computer/Data Processing Equipment

NFPA 101, Life Safety Code, Section 7-7

Fire Protection Handbook Section 18

OSHA General Industry Standards

1910.160 Fixed Extinguishing Systems, General

1910.161 Fixed Extinguishing Systems, Dry Chemical

1910.162 Fire Extinguishing Systems, Gaseous Agent

1910.164 Fire Detection Systems

1910.165 Employee Alarm Systems

NOTE

For questions concerning OSHA standards, contact the appropriate MSC Employee and Labor Relations Office.

USPS documents and directives are requisitioned from area supply centers on Form 7380 Supply Center Requisition.

NFPA publications are available from:
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269-9101

•U.S. GOVERNMENT PRINTING OFFICE: 1986-491-746:20179